TECHNIQUES TO SUPPORT EARLY IDENTIFICATION OF CHILDREN WITH VISION PROBLEMS IN PUBLIC PRIMARY SCHOOLS IN CENTRAL KENYA

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A Research Thesis Submitted in fulfillment of the requirements for the Degree of Doctor of Philosophy in the School of Education of Kenyatta University

OCTOBER 2013

DECLARATION

I confirm that this research thesis is my original work and has not been presented in any other university/institution. The thesis has been complemented by referenced works duly acknowledged. Where text, data, graphics, pictures or tables have been borrowed from other works- including the internet, the sources are specifically accredited through referencing in accordance with anti-plagiarism regulations.

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DEDICATION

To all who believe “the renown that riches or beauty confer

is fleeting and frail; but

mental fineness is a splendid and lasting possession”.

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To our Lord Almighty, thank you very much for giving me the strength to keep going from the beginning to the end, making my efforts come to fruition. To my supervisors, Dr. Chomba Munyi and Dr. Margaret Murugami, your encouragement, guidance, useful suggestions and positive criticisms kept me on my feet. You stimulated my thinking, thus, enabling me to delve deeper into my work. Thank you for giving me your best without reservation. My gratitude to all significant individuals who played major roles during data collection including research assistants, head teachers, class teachers and the school- children. This work would not have been without you- life is really very simple….what you give out, you get back. My sincere gratefulness to all my friends and colleagues in Kenyatta University, you were most supportive and responsive and you helped me grow academically.

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To all of you, "never put off till tomorrow what you can do today"- the present moment is the only one you have, live now! May God Bless You All.

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ABBREVIATIONS AND ACRONYMNS

AMD	Age Related Macular Degeneration
EARCs	Educational Assessment and Resource Centres
GoK	Government of Kenya
ICEVI	International Council for Education of people with Visual Impairments
IEP	Individualized Education Program
KISE	Kenya Institute of Special Education
MDG's	Millennium Development Goals
MoE	Ministry of Education
MoH	Ministry of Health
PAVE	Parents Active for Vision Education
SNE	Special Needs Education
TSC	Teachers Service Commission
UNESCO	United Nations Educational, Scientific and Cultural Organization
VA	Visual Acuity
VI	Visual Impairment
WHO	World Health Organization

ABSTRACT

The aim of this study was to establish whether children with vision problems were identified early and given support to avoid visual impairment in Kiambu, Murang'a and Kirinyaga Counties in Central Kenya. Although visual impairments remain a major threat especially to school children, they can be avoided through early identification. Unfortunately, children with vision problems have largely remained undetected and unsupported. Even worse, the children stand a higher risk of developing visual impairment and failure to attain their academic potential. The major aims of this study were to identify children with vision problems and to explore teacher constraints that hindered early identification of children with vision problems. The study employed a descriptive research design. Convenience sampling was used to select public primary schools from Kiambu, Murang'a and Kirinyaga Counties. Purposive sampling was used to select the respondents including school children from classes two and three, class teachers and head teachers. In data collection, interviews, vision problem identification checklists and visual acuity checker were used which generated qualitative data. Data were analyzed using descriptive statistics and narratives. The findings of the study were: Teachers lacked special education qualifications necessary for effective identification of children with vision problems, a significant number of children were identified with vision problems including those who were holding book close when reading, had a tendency to move near or away from light and those who experienced difficulties reading from chalkboard. About 9% percent of the children had significant visual loss and among them, 1.3% had severe visual loss and could not see using the affected eye/s. Teachers experienced constraints in identifying and supporting children with vision problems like lack of necessary knowledge and skills, lack of qualified personnel to do visual checkups and lack of school visual screening programs. Recommendations included routine vision screening programs for all school children, special education seminars and workshops to equip teachers with relevant knowledge and skills about vision problems identification and necessary support, inclusion of the component of special needs education in pre- service teacher training colleges and creation of vision problem awareness amongst parents and the children.

CHAPTER ONE
INTRODUCTION AND CONTEXT OF THE STUDY

1.1 Introduction

This section provides an overview of background to the study, statement of the problem, purpose of the study, research objectives and research questions, significance of the study, scope and limitations, assumptions of the study, theoretical and conceptual frameworks and finally operational definition of terms.

1.2 Background to the study

In the world today, there are growing numbers of people who have disabilities as a consequence of mental, physical or sensory impairments. According to World health Organization (WHO, 2011), more than one billion persons in the world have some form of disability which corresponds to about 15% of the world's population. The report estimates that approximately 110-190 million people have very significant difficulties in functioning. The estimated number of children with disabilities between 0 and 18 years ranges between 93 million and 150 million, depending on the source.

People with disabilities are among the most marginalized groups in the world and they experience increased dependency and restricted participation in their societies. Even in high-income countries, 20-40% of people with disabilities

lack the help they require to engage in everyday activities (UNESCO, 2008). In the United States of America, 70% of adults with disabilities rely on family and friends for assistance with daily activities (UNESCO, 2008). Children with disabilities are among the most marginalized and excluded groups of children. Too often, children with disabilities are defined and judged by what they lack rather than what they have. Their exclusion and invisibility serves to render them uniquely vulnerable, denying them respect for their dignity, their individuality, even their right to life itself (UNFPA/WHO, 2009). It is worth noting that people with disabilities have been in the society since time immemorial. Although these people have many limitations, the society further exaggerates by the way it interprets and reacts to disability. Additionally, environmental barriers and poor policies exacerbate the impact of disability in the society (World Bank, 2008).

Visual impairment is a significant health problem world-wide. For decades, WHO has been working with its Member States and its international partners to eliminate the main causes of avoidable blindness, by providing technical assistance, monitoring and co-ordination. The World Health Organization (2012) estimates that globally, about 285 million people are visually impaired worldwide: 39 million are blind and 246 have low vision. About 90% of the worlds visually impaired live in developing countries. The same report has been estimated that over 80% of global visual impairment is preventable or treatable. In spite of this, millions of people remain at risk of visual loss due to

the lack of eye-care services. With almost 90% of blind and visually impaired people living in low- and middle-income countries, including some of the world's poorest communities, access to eye care is often unavailable. Another WHO report (2010) reveals that there is an estimated 1.4 million blind children worldwide and, one in five of these children live in Sub- Saharan Africa. Children are the most at risk and childhood blindness has significant impact on health, education and life trajectory. According to WHO (2009), the number of people who have visual impairments globally will escalate to 360 million by 2020 unless elaborate interventions are undertaken to reverse the current trend. The report further indicates that in every five seconds, one person in the world becomes blind and in every minute, a child becomes blind.

United Nations Convention on the Rights of the Child (1989) recognizes the right of all children to survival and development (Article 6), the highest attainable standard of health (Article 24) and to rehabilitative care. In addition, the United Nations Committee on the Rights of the Child recognizes that prevention and early intervention is crucial to prevent permanent loss of sight and developmental delays. In UNCRC Article 23, the convention obliges countries to cooperate to prevent disability and emphasises the rights and freedoms of children with disabilities and the importance of promoting their full enjoyment of life experiences and of exercising their independence to the greatest extent possible. Children with disabilities are also specifically cited in

the Convention on the Rights of Persons with Disabilities (CRPD) Article 7 which ensures their full enjoyment of fundamental freedoms on an equal basis with all other children. The CRPD also demands measures to protect the equal rights of children with disabilities in respect to education. Although the CRPD requires governments to collect information to enable them to fulfil their obligations to date, accurate estimates on children with disabilities including visual impairments are rarely available. The reasons include inadequate resources and also the reality that children with disabilities are often rendered invisible in institutions. Most schools throughout the world lack systems for enhancing communication, appropriate equipment and materials (WHO, 2011).

In Africa, it is approximated that there are 9 million people who are blind and a further 27 million people have low vision (WHO, 2009). Surprisingly, Africa has only 11 per cent of the global population and yet, it represents 18.4 per cent of the world's persons who are blind. This report has projected that this figure will increase to double by 2020 unless rigorous measures are taken to offset the underlying problems (WHO, 2009). In regard to Kenya, the census statistics of 2009 indicates that the population of people with disabilities in Kenya was about 1.3 million, with 25 per cent of them having visual impairments (Government of Kenya, 2010).

Visual impairments in children have important developmental, social and educational implications. In the long run, visual impairments may affect

employment and hinder other opportunities in life. Nevertheless, most visual impairments can be prevented if detected early in life (Lewis & Allman, 2000). The prevention of avoidable visual impairment in children is one of the goals of the World Health Organization. VISION 2020 is the global initiative for the elimination of avoidable visual impairments which seeks to address the main causes of avoidable blindness. The action plan for the prevention of avoidable blindness and visual impairment is intended to serve as a roadmap to consolidate joint efforts aimed at eliminating avoidable blindness in all communities worldwide (WHO, 2003).

Lack of early identification of vision problems and inappropriate intervention strategies have been attributed to the unnecessary multiplication of visual impairments (WHO, 2006). Vision problems are the mild visual losses or vision alterations due to inflammation of the eyes, allergies, eye motility malfunctions or malnutrition. These problems are correctable through provision of medication, surgery or proper nutrition. This explanation is consistent with National Institute of Health (2013), definition of visual loss as the absence of visual functioning where it existed before, and can happen either acutely (i.e. abruptly) or chronically (i.e. over a long period of time). Foster and Gilbert (2001) underscore that most severe visual impairments and blindness in children originate from mild visual problems which were either not identified early enough and/or no interventions were undertaken to address them.

Delayed identification and management of visual problems may impede the child's ability to adapt in the school, family and community (Schaumburg, 1996). According to Parents Active for Vision Education, PAVE (2000), almost 50% of children with visual problems have learning difficulties although strategies that can lead to improved learning and better grades can be put in place. Of course, visual problems can be avoided if well managed through early identification and routine eye examinations. In most cases, early identification prevents their progression into severe visual impairments (Bailey, Indian, Zhang, Geiss, Duenas & Saaddine, 2006).

However, many children with visual loss remain unidentified since they do not get routine vision screening (Flax, 2006; Gigi, 2001). That may be due to the asymptomatic nature of common vision problems, or it might be due to lack of access to healthcare, limited financial means, and/or lack of education regarding the importance of vision screenings (Bailey, et. al., 2006). Screening for visual impairment and identification of children with visual problems encourages intervention measures which play an important role in preventing long- term visual disability (Ebenechukwu, 2012). In the global initiative "VISION 2020 The Right to Sight," childhood visual impairment is highlighted as a priority area (WHO, 2000). However, because of the requirement for additional resources and expertise, along with a general lack of authentic prevalence information, screening for vision problems among

children in Kenyan public schools is currently not a priority in the planning of eye services.

The government of Kenya has enacted the Persons with Disabilities Act which sets out the rights of persons with disabilities including those with visual impairments. Under the Act, Section 18 mandates all learning institutions to accommodate the special needs of all persons with disabilities (GoK, 2004). In reference to the census statistics of 2009 carried out in Kenya, 9.4 million children attend primary school (GoK, 2010). Going by this figure, it is most probable that a large number of this population might consist of children with disabilities who may be identified. However, the Constitution of Kenya has taken into account the rights and interests of all groups of people. Article 27 (4) prohibits discrimination against persons with disabilities. Article 54 (1) requires a person with a disability to access educational institutions, materials and devices to overcome constraints arising from the disability (GoK, 2010). Thus, all children with varying degrees of visual impairments have a right to appropriate education which allows them to participate fully in learning.

The National Special Needs Education Policy identifies education as the main driver in the attainment of the Millennium Development Goals (MDGs). Through the policy, the government has committed itself towards re-examining the provision of education to all through review of existing physical facilities,

curriculum, instructional materials and teacher preparation to ensure that all learners (including those with visual impairments) have equal access to quality and relevant education (Ministry of Education, 2009). Going by this, children who have vision problems in primary schools need to be identified and appropriate strategies put in place. In so doing, educational restrictions experienced by these children will be overcome and eventually, this will promote learning. The Salamanca Statement on Principles, Policy and Practice in Special Needs Education (UNESCO, 1994) states that schools should accommodate all children regardless of their conditions. However, in most public primary schools in Kenya, milder forms of visual impairments in children have largely escaped identification and attention. These conditions create a range of different challenges; hence, schools ought to find ways of successfully educating all children.

Special needs education incorporates the proven principles of sound pedagogy from which all children may benefit. It assumes that human differences are normal and that learning must accordingly be adapted to the needs of the child rather than the child being fitted to pre- ordained assumptions regarding the pace and nature of the learning process (Crissy, 2009). A child-centred pedagogy is beneficial to all students and, as a consequence, to society as a whole. Sadly, for too many children with vision problems, their attendance at school is a largely unsatisfying experience, leaving them despondent about their own capabilities and disillusioned about the value of education to their

lives (Zionts, 1997). Therefore, this study looked at the techniques that could be used to support early identification of children with vision problems for early interventions.

1.3 Statement of the Problem

Despite the emphasis of early identification of visual impairments by International Council for Education of People with Visual Impairments (ICEVI, 2005), millions of school children remain at risk of visual loss due to under identification. This recognition is evidenced by its inclusion in the priority areas of Vision 2020. Early identification of children with vision problems is important because often, signs of vision problems are not discovered until children have suffered through many years of poor school performance, repeated discipline problems, feelings of poor self-worth, and numerous other difficulties (Bailey, Indian, Zhang, Geiss, Duenas & Saaddine, 2006). Since most of the children with unidentified vision problems are asymptomatic, visual screening brings about early identification and timely interventions (Hunt & Marshal, 2002). Delayed and lack of early identification of children with vision problems continues to be responsible for the needless multiplication of visual impairments (Gigi, 2001 & Thomson, 2005).

In Kenya, majority of the school children attend public primary schools and the government has committed to providing equal educational opportunities to all

children. To fulfil this commitment, there is need for early identification of children with vision problems. This concern could effectively be addressed through school vision screening programmes to identify those at high risk of developing visual impairments for early interventions and support.

Previous research has indicated that of all school-age children world-wide, twenty- five per cent (25%) suffer from unidentified vision problems (WHO, 2009). Consequently, Kenya with a population of about 9.4 million children in primary schools (GoK, 2010) could be having a massive number of children with unidentified vision problems. This, therefore, prompted the need for early identification of children with vision problems, an area which have not been exhaustively researched.

1.4 Purpose of the Study

The purpose of the study was to investigate the techniques that could be used to realise early identification of children with vision problems for early interventions. Since majority of the schoolchildren in Kenya attend public primary schools, addressing matters that hinder early identification and early interventions/support would be a breakthrough in promoting academic achievement as well as reducing/ preventing visual impairments.

1.5 Objectives of the Study

1. To examine special education qualifications and the ability of teachers to identify children with vision problems in public primary schools.
2. To identify children with vision problems in public primary schools.
3. To find out how teachers support children with vision problems in public primary schools.
4. To establish teachers' constraints in identifying and supporting children with vision problems in public primary schools.
5. To explore ways of promoting early identification of vision problems among children.

1.6 Research Questions

1. What are the special education qualifications of teachers in public primary schools?
2. Which vision problems are the teachers able to identify?
3. Which vision problems are exhibited by children in public primary schools?
4. What kind of support do teachers offer to children with vision problems?
5. What constraints do the teachers encounter in identifying and supporting children with possible vision problems?
6. In what ways can early identification of children with vision problems be enhanced in public primary schools?

1.7 Significance of the Study

This study investigated children with vision problems in public primary schools. The findings of this study may create awareness to teachers about vision problems and the relevant special education supportive measures available. This awareness could assist them in identifying any vision problems early for timely interventions. The information gathered from this study would also act as an impetus for Educational Assessment and Resource Center (EARCs) personnel to justify the need for vision screenings in public primary schools which could greatly facilitate identification of children with vision problems. Early identification of vision problems in children is useful in determining the appropriate supportive measures that could be put in place to help the children affected. Besides, the study findings may also act as a wakeup call to the Ministry of Education to rethink about organizing special education pre-service and in-servicing training courses for all teachers to equip them necessary knowledge and skills to help them identify school-children with vision problems before they deteriorate. The findings may also provide information that could inspire future research in the area of visual impairments in public primary schools. More importantly, the study was intended to instigate other researchers in doing more research on early identification of special needs cases in public schools.

1.8 Limitations and Delimitations of the Study

Clark (2009) describes limitations as challenges faced by the researcher beyond his control that may affect the results of the study or how the results are interpreted. In this study, limitations included the dearth local literature and publications in the area of study. Due to this, the researcher took a global perspective in reviewing literature and also gleaned through available relevant research in Africa. Additional limitations included financial constrains and time availability to complete the study since the researcher was on full- time employment.

Delimitations are characteristics that define the scope or the boundaries of the study (Clark, 2009). In this study delimitations included selection of one geographical area (Central Kenya) and it focused on public primary schools only. The sample size comprised only class two and three pupils and their class teachers and head teachers. The study also ventured into one category of disabilities, visual impairments and focused on vision problems. This study examined only the very common visual problems prevalent in children. It is important to note that there are a myriad of vision problems that exist in school children which could be investigated and possibly yield additional and richer results.

1.9 Assumptions of the Study

The present study anticipated that since the study population was being drawn from public primary schools, there were children with unidentified vision problems which required to be identified for early interventions. Another assumption was that teachers experienced constraints in identifying and supporting children with vision problems.

1.10 Theoretical Framework

This study was guided by Vygotskian Theory, (1896- 1934). Vygotsky's theory surrounding the concept of special education underscores the need for assessment of children with special needs so that their individual needs can be catered for through the appropriate strategies. Although Vygotsky had no chance to elaborate on his ideas to formulate specific assessment operations, he expressed that in education, there are some learners who have peculiar "factors" which lead to the inability of the education system to accommodate them (Swart & Pettipher, 2005). Today, these "factors" are known as the special needs.

In support of Vygotsky's ideas, many school children have special needs (including vision problems) which are unidentified. Consequently, when the needs of these children are not catered for, they do not achieve their academic potential. As described by Knowler (1990), visual learning accounts for 80% of

the learning process. It therefore follows that when a child has a vision problem, their academic progress will be affected although the teachers and the parents may fail to see the connection between poor academic performance and the child's vision. Worth noting is that most early signs of visual impairments may be mild and hence they are either ignored or never identified in the first place.

According to Atkinson (1993), signs of possible vision problems in school children include consistently holding a book too close, losing place while reading or using a finger to guide eyes when reading, squinting or tilting the head to see better, frequent eye rubbing, sensitivity to light and/ excessive tearing, closing one eye to read and avoiding activities which require near vision such as reading or homework, complaining of headaches or tired eyes and receiving lower grades than usual. In Kenyan public primary schools, children with vision problems mainly remain under-identified and hence their needs are not catered for in special education.

Vygotsky argues that assessing children's needs could derive important information about their unique special needs and stresses the importance of developing special strategies to address them. In this study, investigation of children with vision problems was a major concern which aimed at early identification and suggestion of related special education interventions.

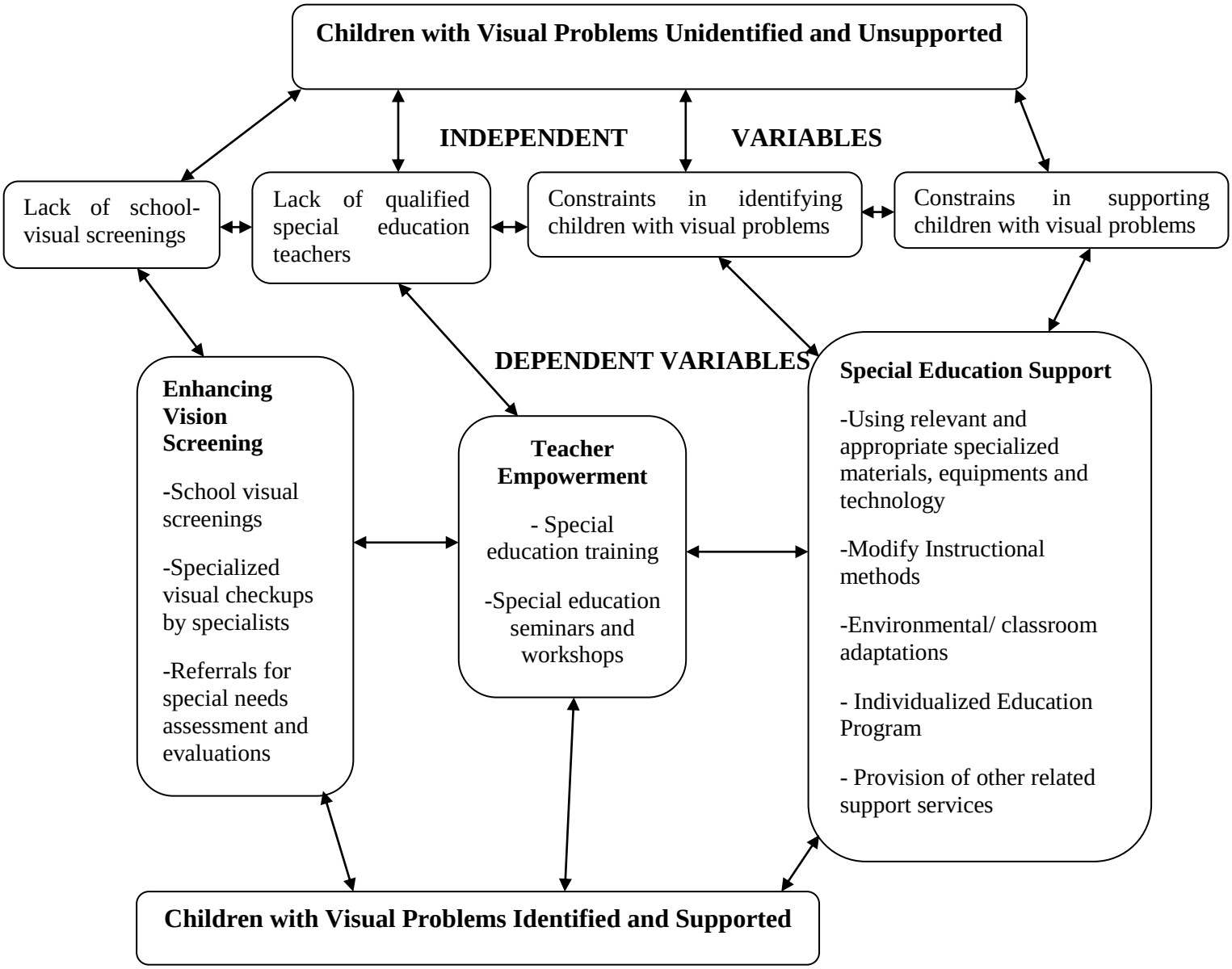
According to Ira (2008), the main challenges of early identification of school children at risk of visual impairments lack of awareness of signs of visual problems and their potential effects, non- availability or inability to afford services for assessment, late detection and lack of follow- up.

Vygotsky expresses that special education should be hinged on the individual needs of a child. He further stresses that understanding the special need of a child and working towards alleviating or improving it should be core (Vygotsky, 1995). To back these sentiments, Das (1995) has noted that special education should not be just a diminished version of regular education, but a specially designed setting to assess, detect and exclusively serve the individual needs of the children with special needs. In line with these views, this study identified children at risk of developing vision problems. It further suggested correlated special educational support which can be provided to address the exhibited vision problems.

1.11 Conceptual Framework

The conceptual framework in Figure 1.1 shows Factors contributing to Identified/ Unidentified vision problems in children and related support.

Figure 1.1
A Conceptual Framework on Factors contributing to Children with Vision Problems Identified and Supported/ Unidentified and Unsupported



Source: (Researcher, 2013)

The conceptual framework depicted in Figure 1.1 is hinged on the theoretical keystone of the study, that, any child with a special need ought to be identified and appropriate measures to address the special need undertaken. In this respect, this study focused ways/ actions that could enhance early identification of children with vision problems for early interventions and support. As shown in the conceptual framework, children with vision problems can remain unidentified and unsupported due to lack of school- visual screening programs. Regular school vision screenings encourage early identification and interventions for mapping out relevant services, accommodations and referral protocols to enhance child functioning and participation at school. Other factors that may hinder early identification and provision of support of children with vision problems are lack of qualified special education teachers and constraints that teachers may encounter in identifying and supporting these children.

Vygotsky's theory supports identification and provision of support for children with disabilities. Therefore, children with vision problems need to be identified early and appropriate support provided. This can be enhanced through provision of regular school vision screening services, empowering teachers with knowledge and skills concerning vision problems as well as addressing constraints teachers encounter in identifying and supporting children with vision problems.

Special education support ought to embrace modification of instructional methods by the teachers to include: having the child sit closer to see board; giving child copies of teacher notes; reading notes aloud while writing on board; providing audio tapes of reading material; allowing children to give in taped rather than written responses and providing opportunities for hands-on learning. Other educational support include environmental/ classroom adaptations should comprise using bold-line paper, felt-tip pens with high-contrast colours, supplementary light source, magnification device, book stand, cassette tape recorder/player, sun visor or light shield to reduce glare and avoiding glaring light.

1.12 Operational Definition of Terms

Children at risk: Refers to children who, although not currently identified as having visual impairment, are considered to have a greater than usual chance of developing visual impairments. In this study, it embraces the children with vision problems.

Constraint: Specific difficulties, challenges, perceptions, views or actions that negatively affect teacher's ability to identify or support children with vision problems. This could be in terms of slowing down, blocking forward progress or hindering early identification and provision of support to children with vision problems.

Early Identification: In this study, the term means ability to detect children vision problems when they are still in their early years of primary education (in lower primary), aimed at early interventions.

Early Interventions/ Support: Refers to measures that can be undertaken to reduce, eliminate or prevent the effects of vision problems in children. These interventions/ support should assist the child to maximally utilize his/ her academic potential as well as improve quality of life.

Occluder: An object that temporarily obstructs vision during vision screening or testing, preventing an eye from visualizing a focal point.

Ophthalmologist: This term refers to a medical doctor specializing in diagnosis and treatment of diseases of the eye.

Optometrist: This term means a professional who examines eyes and vision, to prescribe and provide glasses and contact lenses.

Public School: This is a government primary institution which mainly admits children from all cadres of family backgrounds and runs from class one to class eight.

Rural Primary School: Primary school which is not within the precincts of a town centre.

Special Education Interventions: It means the measures that can be taken to enhance early identification of visual loss in children as well as the support services that can be provided to cater for their individual needs.

Special Needs Education: In this study it means the education offered to children with special needs.

Special Needs: These are conditions which could be physical, psychological, social or cognitive that make an individual's performance and abilities differ significantly from that of an average person.

Techniques: Refers to methods, actions or ways of supporting early identification of children with vision problems.

Urban Primary school: Describes a primary school found within the precincts of a town centre.

Visual Impairment: Impairment in vision, that even with correction, adversely affects a child's educational performance (Hunt, 2002).

Visual Loss: In this study, visual loss is determined by visual acuity measurements. Significant visual loss is considered to be a visual acuity of 6/12 or less in either one or both eyes.

Vision Problems: Includes complaints or difficulties associated with efficient use of the eyes, eye conditions that may distort or suppress the normal visual functioning (like blurred or double vision) and/or behavioural indications of poor vision for example stumbling on objects when walking, bringing book close when reading and so on.

Vision Screening: Describes visual observations or visual measurements which are done to detect signs of visual loss or vision problems in children. This can be done by professionals or qualified special education teachers.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter has presented a review of the pertinent literature that anchored this study. The areas reviewed included: classification of visual impairments, avoidable vision impairments in children, indicators of vision problems in school children, early identification of vision problems in school children, vision screening in school children, supporting children with vision problems and vision loss, and summary of reviewed literature.

2.2 Classification of Visual Impairments

Visual impairment is a complex term that encompasses a vast range of impairments and is categorized in various ways. Legal blindness is visual impairment where individuals must use tactile and auditory senses as their primary channel for acquiring information (Wendy, 2003). However, categorizations based on the extent to which children with visual impairments use their visual and other channels for learning are more useful to providers of educational services. The educational classification of visual impairments are described as moderate, severe and profound and are not based on tests (Wendy, 2003), but rather on the special educational adaptations that are necessary to help the affected children to learn. Individuals with Disabilities Education Act

(IDEA, 1998) emphasize the relationship between vision and learning in the education as:

 with moderate or low vision impairment, an individual uses eyes as a primary means of learning. It can be improved with the help of visual aids;

 with a severe visual or functionally blind impairment a learner receives learning content primarily through hearing and is helped somewhat with visual aids. The child can still use vision as a channel of learning. This classification is equivalent to the definition of a child with low vision;

 with a totally blind or profound visual impairment an individual receives no useful information through the eyes. For this learner, touch and hearing are the predominant learning channels. This classification is at the level of legal blindness.

IDEA (1998) confirms that impairment in vision, even with correction, adversely affects a child's educational performance. Each eye condition has an impact on vision, therefore, the impact that a visual impairment has on learning is unique to every learner. The vast majority of learners with a visual impairment have some useful sight, although the degree of sight can vary greatly. For many learners with a visual impairment, reading and writing presents barriers to learning (IDEA, 1998). According to Argyropoulos, Sideridis and Katsoulis (2008), "*a visually handicapped learner is one whose visual impairment interferes with his best possible learning and achievement, unless adaptations are made in the methods of presenting learning*

experiences, the nature of the materials used, and/or in the learning environment".

According Njoroge, Verweyen and Hyvärinen (1996), visual impairments can be classified into four categories. The first category consists of totally blind children who are braille users. The second category comprises children who have some useful vision but not enough to read print, thus they are braille users. The needs of children in this category are sometimes neglected especially when they are treated like children in category one. However, they require special training like visual stimulation. In the third category, the children can read print with optical devices and require specific training and advice on how they can use their optical low-vision devices efficiently. Children in category four can read print with magnification and require special considerations while training to use print. Majority of the children with low vision have useful vision but they are educated through techniques, methodologies and resources meant for children who are totally blind. This has contributed to children with low vision becoming more dependent on their immediate associates in and out of school and has slowed inclusion of children with low vision into regular schools (Lewis & Allman, 2000).

2.2.1 Vision Loss and Vision Problem

According to National Institute of Health, (2013) vision loss or visual loss is the reduction of vision where it existed before, which can happen either acutely (i.e. abruptly) or chronically (i.e. over a long period of time). Acute visual loss may be dramatic in presentation. It may be caused by opacities, retinal disease, optic nerve disease, visual pathway disorders, or functional disorders, or it may be in fact an acute discovery of chronic visual loss. Other eye disorders, eye injuries and birth defects can also cause vision loss. Regular comprehensive eye exams and prompt interventions and treatment are critical.

Many individuals have mild vision loss (Borsting, 2006).Vision loss represents deficits in two broad visual system components: visual efficiency and visual information processing (Thomson, 2005). Visual efficiency comprises the basic visual physiological processes of visual acuity (and refractive error), accommodation and ocular motility. Visual information processing involves higher brain functions including the non-motor aspects of visual perception and cognition, and their integration with motor, auditory, language, and attention systems (Cotter, 2006).

Visual efficiency problems, on the other hand include uncorrected refractive error, dysfunction of accommodation control systems and ocular motility (Flax, 2006). These vision problems are correctable and that is why literature argues

about avoidable blindness and visual impairment. The uncorrected vision problem leads to visual loss. The definition of vision loss is not universal among educators and other health professionals. Too often it is interpreted narrowly as distance visual acuity. Although distance visual acuity is relevant for such tasks as copying from the whiteboard, other aspects of vision involving efficiency and information processing are fundamental to such near-point activities as reading, writing, and other classroom and learning activities (Swamson,2006). Proper diagnosis of vision loss therefore requires comprehensive evaluation of visual efficiency and visual information processing skills (Cron, 2006).

2.3 Avoidable Visual impairments in Children

A wide variety of mild visual conditions and diseases may cause visual impairments although if detected early, progression into severe visual impairments can be minimized or arrested. Cataract remains the leading cause of visual impairment in all areas of the world except for developed countries (WHO, 2000). Cataract is opacity of the eye lens and can occur as a consequence of the ageing process, after untreated infections, trauma, or various illnesses. Common symptoms that can be observed in school children include, hazy vision that might be worse in bright light, weaker vision at night; difficulty in discerning movements, details, or objects, double vision and a milky white or opaque appearance to the normally dark pupil (Wendy, 2003).

Glaucoma is a disease whereby there is an increase in the fluid pressure inside the eye, leading to loss of side vision and eventually total blindness. The increased pressure destroys the optic nerve. Symptoms which may indicate glaucoma include sudden onset of severe throbbing eye pain, headaches and blurred vision (Wendy, 2003).With early detection, glaucoma can be kept under control although chances of developing it increase with age (Kirk, Gallagher, Coleman & Anastasiow, 2008).

Low vision is a major cause of morbidity and has profound effects on the quality of life for many people as it inhibits/reduces mobility and economical well being of the affected individuals and their families (American Academy of Ophthalmology, 2007). A study was carried out to determine the magnitude and causes of low vision among primary school children in Kibaha district in Tanzania Kingo & Ndawi (2009). Primary schoolchildren were recruited for the study. The inclusion criterion was individual child with low vision of less than 6/18. Visual examination was used for screening the children to identify those with vision less than 6/18. Snellen's chart was used to measure visual acuity of the children with low vision. A total of 400 (6-17 years) schoolchildren were screened. Thirty-eight (9.5%) had low vision. Among the cases, 8 (54%) had low vision caused by uncorrected refractive errors while the rest (46%) were due to other types of refractive errors. The study indicated the need for an early detection of the possible causes and appropriate interventions

to reduce the condition among schoolchildren. It recommended school eye screening programmes for early detection and treatment; need to strengthen advocacy programmes targeting schoolchildren, teachers and caregivers on the importance of low vision.

Another study was done in Pakistan to determine the causes of childhood blindness. This was a national survey which examined 1,000 children in 46 schools using WHO guidelines for childhood blindness. The survey found out that 77.5% of children enrolled in these schools were blind and the remainder had low vision. The main causes of blindness were retinal disease (51%) and corneal problems (3.7%). The study was instrumental in engaging government education planners and policy- makers with inclusive education. The data also formed the basis for a national consultation on inclusive education that resulted in setting up low vision clinics, resource centres and early intervention centres (Sight Savers International, 2005).

An additional study was done to identify the causes of blindness and visual impairment in school children of Ilesa-East local government area of Osun State, Nigeria (Ajaiyeoba, Isawumi & Oluleye; 2005). A total of 1144 school children in primary and secondary schools were selected using a 2-stage random sampling method and examined to determine the prevalence of blindness and visual impairment. These comprised 11 (0.96%) children who

were visually impaired and 4 (0.34%) who were severely visually impaired. Only 2 (0.15%) school children were blind. The study concluded that prevention, early recognition and prompt treatment of visual loss by regular screening of school children would definitely reduce unnecessary visual impairments in Nigerian school children so that they can attain their full potential in education.

In East Africa, children in schools for the blind in Uganda, Tanzania, Malawi, Zambia and Kenya were examined to identify their levels of vision and the cause of visual loss. A total of 1,062 children enrolled in the schools for the blind were examined according to standard WHO criteria. The common causes of blindness were found to be corneal scars (19%), diseases of the whole eyeball (16%) and cataract (13%). The results provided evidence for ongoing efforts to strengthen eye care, including programmes to train teachers in childhood blindness. The findings also provided further evidence that there are still many children in schools for the blind who could attend mainstream schools with only a little specialist support (Sight Savers, 2005).

The abovementioned studies have shown that there are many types of avoidable visual impairments in children and have given useful insights on how they can be addressed before they worsen. The studies have indicated that initially the visual impairments are mild and easily ignored and if undetected

they deteriorate and significantly impact the quality of one's life. The studies have also disclosed the need for early identification and appropriate interventions and support. The current study investigated school children with vision problems in the early years of education and identified support measures that could address the exhibited vision problems.

2.4 Indicators of Vision Problems in School Children

Vision plays a vital role in the learning process and children who have vision related problems often struggle unnecessarily in school (Groffman, 2006). When a child struggle to see, read, write or fully participate in school, a vision related problem could be the cause. With early detection, follow- up and the right support, children with vision problems can reach their full potential and flourish in school and in life (Lerner, 2006).

Ebenechukwu (2012) estimates that 75 to 90 percent of all learning in the classroom comes to the student either wholly or partially via the visual pathways. If there is any interference with these pathways, the student will probably have trouble with learning tasks (Hoffman, 2006). Reading, spelling, writing, chalkboard work, homework and, in some schools, computers are among the visual tasks children tackle in most of their academic exercises (Borsting, 2006 and Groffman, 2006). Visual learning accounts for 80 per cent of the learning process, therefore, poor vision can severely affect progress at

school. In fact, visual problems could be a factor in 40 per cent of children's learning difficulties (Knowler, 1990). Children who lack good basic visual skills often struggle in school unnecessarily and portray educational deficits. Their "hidden" visual problem keeps them from performing well, yet teachers and parents often fail to make the connection between poor performance and the child's vision (Eden, 2001).

The aforementioned views are similar to those revealed in a study done by Eberechukwu (2012) on learning related vision problems in school-age children in Imo State University and Secondary schools indicated that, basic visual skills are important to the learning dispositions of children and their capabilities to carry out academic tasks. The study involved 200 children aged 10-18 years and the data was gathered using questionnaires and ophthalmoscopes to identify vision problems experienced by children in public primary schools in Nigeria. The results of the study revealed that children in the 10-12 year old age group were more affected by vision problems (46%) than the 13-15 year old group, while the least affected with only 12% prevalence were those between 16 and 18 years. The study concluded that children with vision problems had difficulties in learning and had lessened reading capabilities.

Eye discomfort may make it difficult to complete school tasks or homework assignments in a timely manner. Distraction or inattention may become

secondary complications. Task avoidance is a frequently overlooked effect (Selznick, 2006). Straining during visual tasks can lead to less time on task, decreasing the opportunity for practice and learning, particularly in vocabulary development, comprehension, and reading mechanics (Lerner, 2006). A harmful associative relationship between eye discomfort and the learning activity can develop, leading to disinterest and poor motivation for traditional learning activities (Thomson, 2005).

Blurred, double vision, or distorted text can be expected to decrease word processing speed and efficiency, reduce reading rate, and compromise reading comprehension. Inadequate attention allocation for information processing can exist when attention is diverted to manage the visual efficiency problem at the expense of the ongoing processing required for learning (Optometric Clinical Practice Guidelines, 2006). The proliferation of computer-assisted instruction in the school setting, notwithstanding the dramatic increase in computer use at home and school; has created an even greater demand for visual efficiency (Kauffman, 2004).

According to Atkinson (1993), warning signs of visual problems in school-age children include; consistently sitting too close to the television or holding a book too close, losing place while reading or using a finger to guide eyes when reading, squinting or tilting the head to see better, frequent eye rubbing,

sensitivity to light and/ excessive tearing, closing one eye to read and avoiding activities which require near vision such as reading or homework, or distance vision, such as participating in sports or other recreational activities. Other symptoms include complaining of headaches or tired eyes and receiving lower grades than usual (Thomson, 2005).

Every child needs the following vision skills for effective reading and learning: Focusing Skills (accommodation) involve the ability to look quickly from far to near and vice versa without momentary blur. This skill involves the clearing of an image for identification. A child with accommodation problems will tire easily, blinks to make the chalkboard clear up after desk work, rubs or blinks eyes during or after short periods of visual activity, makes errors in copying from chalkboard to paper or desk, or from reference book to notebook, avoids near centred visual tasks, comprehension reduces as reading is continued and loses interest too quickly (Selznick, 2006).

Eye Teaming Skills (Binocularity) involve the ability to use both eyes together smoothly, equally, simultaneously, and accurately. Poor eye teaming skills lead to extreme head tilt while working at desk, complaining of seeing double, omits letters, numbers or phrases and repeats letters within words. Eye-hand coordination skills (visual motor integration) are the integration of the eyes and the hands as paired learning tools (Thomson, 2005). With this skill comes more

effective ability to make visual discrimination of size, shape, texture and location of objects. With poor eye- hand coordination skills, the child writes crookedly, poorly spaced; cannot stay on ruled lines, uses finger or hand to keep place on the page and extreme lack of orientation in placement of words or drawing on the page (Knowler, 1990).

Excessive head and body movements frequently accompany ocular motility deficiencies. According to Thomson (2005) and (Cron, 2006), the signs and symptoms of ocular motility deficiencies include moving head excessively when reading, skipping lines when reading, omitting words and transposing words when reading, losing place when reading, requiring finger or marker to keep place when reading, experiencing confusion during the return sweep phase of reading and experiencing illusory text movement.

The ability to make rapid changes in accommodative responses is important for school-related tasks like copying from the chalkboard. Facility testing also probes sustainability of the response, which is important for extended near-point activities like reading (Cotter, 2006). The signs and symptoms of accommodative dysfunctions include eye strain when reading or writing, headaches associated with near visual tasks, blurred vision at distance or near, double vision/ diplopia at distance or near, decreased attention for near visual tasks, close near working distance, overlapping letters/words in reading and

burning sensations or tearing of the eyes during near visual tasks (Elbaum, 2005).

According to Optometric Clinical Practice Guidelines (2006), visual spatial orientation is the awareness of one's own position in space relative to other objects, as well as the location of objects relative to each other. Visual spatial orientation skills involve the ability to understand directional concepts, both internally and projected into external visual space. These skills are important for balance and coordinated body movements (Groffman, 2006). The signs and symptoms of visual spatial orientation skill deficiencies include delayed development of gross motor skills, decreased coordination and balance, confusion of right and left and letter reversal errors when writing or reading (Elbaum, 2005).

Visual-motor integration (or visually guided motor response) is the ability to integrate visual information processing with fine motor movements and to translate abstract visual information into an equivalent fine motor activity, typically the fine motor activity of the hand in copying and writing (Selznick, 2006). According to Elbaum (2005), the signs and symptoms of visual motor integration skill deficiency include: difficulty copying from the chalkboard, writing delays and mistakes, letter reversals or transpositions when writing, poor spacing and organization of written work, poor posture when writing and

exaggerated paper rotation when writing (Optometric Clinical Practice guidelines, 2006).

In order to facilitate learning, children with poor visual skills need to be identified and be made aware of their visual problems. However, Criss (2009) notes that a significant number of children have visual problems that interfere with their ability to learn and yet most of them do not realise and are not aware that everyone does not see the same as they do. Similarly, parents and teachers are frequently unaware of the existence of visual problems and easily mistake them for other similar conditions (Foster and Gilbert, 2001). Cotter (2006) observes that if teachers and parents were alert about the possible signs of visual problems, they would be in a better position to identify such children and ultimately reduce the impact of the disability.

In line with the discussion in foregoing section, this study sought to bridge the gap of early identification of children with vision problems. It investigated the indicators of visual loss in school children and the ability of teachers to detect these problems. This study found out that teachers faced challenges in identifying these children which mainly revolved around lack of awareness about visual problems.

2.5 Vision Screening in School children

As pointed out by Knowler (1990), vision screenings are brief, simple procedures used to identify potential visual problems. The screening can help determine the children who may need further diagnostic assessment, or an educational evaluation. According to Adams (2010), vision screening aims to raise awareness and prevent visual impairments, particularly among people with limited access to healthcare. Vision screening also reduces the number of people with undetected or undiagnosed visual problems. The American Optometric Association recommends vision screenings at the ages of 6 months, 3 years and 5 years, and then every other year while the child is in school. If these guidelines are followed, the screening can be an important safety net, alerting possible visual problems as they develop (Bedinghaus, 2009).

According to the New York State Education Department (2011), vision screening programmes should be an integral part of the total school health programme. The major objectives of a school vision screening programme are to identify children with potential vision problems through selected vision screening procedures and planned procedures of observation, to notify parents or guardians that their child has been identified as having a possible vision problem and needs for further examination by an eye care professional. It should further establish follow-up procedures to ensure that each identified child will receive appropriate care, inform teachers of children with vision problems and provide recommendations regarding the classroom environment,

and finally provide appropriate educational accommodations for students with visual impairment (WHO, 2009).

An understanding of the importance of vision screening by administrators, teachers, school nurses, other school personnel and parents is critical to the outcome of a child's academic success (Cotter, 2006). Vision loss is a common problem in the pre-school and school age population (Marshal, Meetz & Harmon, 2010). Early detection and treatment of these visual losses will lessen the possibility of any damaging long-term effects and may have a direct impact on each child's academic performance (Schumucker, 2009).

Similarly, an Iranian study of 215 respondents found that 18 (8.4%) recorded a visual acuity of 6/12 or worse in at least one eye. The study revealed that passing distance visual acuity vision screenings does not adequately insure that children have no need for vision treatment. Also, despite good ability to see far away, they may not be able to see clearly at near, or they may suffer from symptoms not addressed by distance visual acuity screenings. While this investigation did not prove that correcting vision-related problems in children would improve their academic standing, it illustrated an increased probability of a high prevalence of vision-related problems in children. The study suggested that more formal studies of the benefits of vision correction for students who struggle academically must be conducted to determine the true

effects of vision problems on learning-related problems. Although the results did not definitively prove that children struggling in school were more likely to have vision problems, it provided motivation to evaluate the prevalence of vision-related problems in children. The study concluded that children who experienced vision problems should undergo comprehensive vision examinations to identify and treat these conditions (National Commission on Vision and health, 2012).

In most African countries, national pre-school or school eye screening services rarely exist. Screening is only performed sporadically by some local eye personnel (Dana, 2005). This relates to what was pointed out by Smeeth (2000) that a great majority of children never have any planned vision screening and if it occurs, it is mainly incidental. To stress the importance of vision screening in identifying visual loss, a study was conducted by Adegbehingbe (2005) on 1,707 students attending public high schools in Ile-Ife, Osun State, Nigeria. Out of the 1,707 students screened, undiagnosed visual problems accounted for 13.5 per cent. Only 12.5 per cent had had a vision examination done at one time or another. The study suggested that screening programmes for school age children coupled with immediate referral and follow- up procedures were vital in preventing visual impairments.

Visual loss is a known cause of visual impairment and may cause blindness worldwide (American Academy of Ophthalmology, 2007). To determine the prevalence of visual losses among school children attending lower primary in Kampala district; a study was conducted by Medi and Mayaku (2002). It was a cross-sectional descriptive study which involved 623 children aged between 6 and 9 who had a visual acuity testing done at school. The results indicated that 73 children had a significant visual loss of 6/12 or worse in one or both eyes, giving a prevalence of 11.6%. The study concluded that significant visual loss occur among primary school children aged 6 to 9 years at a prevalence of approximately 12%. The study recommended regular and simple vision testing in primary school children at least at the commencement of school so as to detect those who could be having visual loss.

A similar study was conducted by Solange & Fabio (2008) on prevalence and causes of visual impairment in low–middle income school children in São Paulo, Brazil. Cluster sampling was used to obtain a random sample of children ages 11 to 14 years from public schools (grades 5–8) in three districts from June to November 2005. The examination included visual acuity testing in children with uncorrected visual acuity 20/40 or worse in either eye. A principal cause of visual impairment was determined for eyes with uncorrected visual acuity of 20/40 or worse. A total of 2441 children were examined. The prevalence of uncorrected visual acuity of 20/40 or worse in the better eye was 4.82%. The study concluded that the prevalence of reduced vision in low–

middle income urban São Paulo school children was low, most of it because of uncorrected visual loss. It recommended cost-effective strategies to address this easily treated cause of vision impairment.

Another study conducted in Sweden (Merc, 2006) investigated whether vision screening reduced visual impairments in children. All children (3126) born in 1982 were followed from birth to ten years. At the age of 4, 7 and 10 years, visual problems were investigated at school through screening. Results indicated that in the population, 344 (11%) children had visual problems. The study concluded that visual screening is effective in detecting visual disorders and that the prevalence of visual problems is greatly reduced by screening.

Visual acuity, which is the ability to clearly distinguish forms or discriminate details at a specified distance, is measured using the Snellen chart (Figure 2.1). Assessment of visual acuity in children with vision problems should be measured and children with sufficient verbal communication who know the alphabet can be tested using a Snellen chart. Most frequently, visual acuity is measured by reading letters from a chart placed 6 metres away (Hunt & Marshall, 2002).

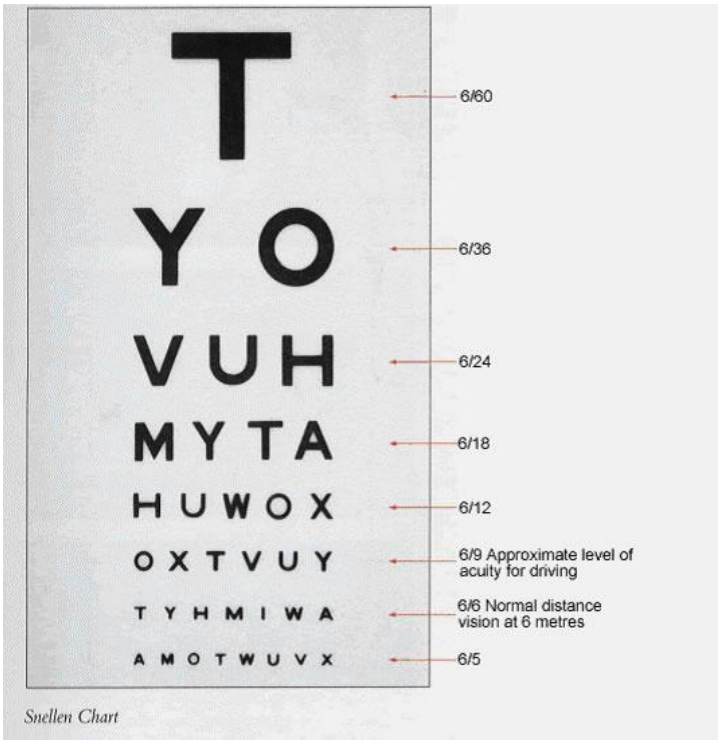


Figure 2.1: **Snellen Chart for testing Visual Acuity**

(Source: Carlson & Nancy, 2004)

The Snellen chart is printed with eleven lines of block letters. The first line consists of one large letter and subsequent rows have increasing numbers of letters that decrease in size. A person taking the test covers one eye, and reads aloud the letters of each row, beginning at the top. The smallest row that can be read accurately indicates the person's visual acuity in that eye. Visual acuity is represented as a fraction, with the distance at which an individual is standing being the numerator and the normal maximum legible viewing distance as the denominator for instance 6/60, 6/18, 6/12, 6/6 and so on (See Table 2.1).

Table 2.1: ***Visual Acuity Scales***

Foot	Metre	Decimal
20/200	6/60	0.10
20/160	6/48	0.125
20/125	6/38	0.16
20/100	6/30	0.20
20/80	6/24	0.25
20/63	6/19	0.32
20/50	6/15	0.40
20/40	6/12	0.50
20/32	6/9.5	0.63
20/25	6/7.5	0.80
20/20	6/6	1.00
20/16	6/4.8	1.25
20/12.5	6/3.8	1.60
20/10	6/3	2.00

(Source: Carlson & Nancy, 2004)

According to Carlson & Nancy (2004), visual acuity is typically measured monocularly and takes the following procedure: The chart is placed at 6 meters and the distance illuminated; if the person uses glasses, then the test is performed using them; the occluder is placed in front of the eye that is not being evaluated, the first evaluated eye is the one that is believed to see less or the one the person says that is seeing less; start first with the big optotypes and proceed to the smaller ones, the person has to identify each optotype on the line being presented and communicate it to the examiner. The occluder is changed to the other eye and the process repeated.

American Academy of Ophthalmology (2007) asserts that visual acuity measurement involves more than being able to see the optotypes. The person being examined should be cooperative, understand the optotypes and also be able to communicate with the vision examiner. If any of these factors is missing, then the measurement will not represent the person's real visual acuity. Penny (2010) attests that although visual acuity measurement is a good screening test, some children may fail or pass based on variables other than vision. Children who do not know the letters may not pass the test, some may memorize the order of the letters if they hear other children say them and some letters of the alphabet are easier to discriminate than others, which leads to guessing. As shown in Table 2.2, WHO (2002) categorizes visual loss into normal, mild, moderate and severe.

Table 2.2: ***Ranges of visual Loss***

Visual Loss	**Line No.**	**Snellen Feet**	**Equivalent Metres**	**Decimal Equivalent**
Normal				
	0	20/20	6/6	1.00
	1	20/25	6/7.5	0.08
Mild	3	20/40	6/12	0.50
	4	20/50	6/15	0.40
Moderate	7	20/100	6/30	0.20
	9	20/100	6/40	0.15
Severe	10	20/200	6/60/	0.10
	11	20/250	6/75	0.08

(Source: WHO, 2002)

2.6 Early identification of Vision Problems in School Children

Since the evidence that vision problems can be prevented to any substantial degree is inconclusive, the emphasis is on early detection (Elizabeth and Pattni, 2003). It is recommended that vision examinations be scheduled at 6 months, 3 years of age, and at entry into school, at which time the parents should complete a developmental questionnaire (Optometric Clinical practice Guidelines, 2006).

When signs and symptoms are suspected, a more extensive evaluation is necessary for the early identification of the child at risk for the development of vision problems (Lerner, 2006). Most school districts now conduct some form of developmental screening before children enter school (American Optometric Association, 2006). Such screenings tend not to explore visual problems extensively as needed (Swamson, 2006). The majority of school vision screening programs only assess distance visual acuity. This is woefully inadequate in detecting most learning related vision problems. Thorough eye and vision examinations during the preschool years, and consistently through the school years continue to be the most effective approach to early detection of visual problems in children (Groffman, 2006).

Parents are often the first to suspect that their child may have a sensory defect, such as a visual loss (American Optometric Association, 2006). It is highly

important to identify sensory problems in children as soon as possible, so that there is no delay in providing appropriate correction and interventions. The impact of even fairly moderate sensory impairments can have a very significant impact on the child's early interactions, learning and development (Elbaum, 2005). Generally, the more severe the visual impairment, the more likely it is to be identified early.

According to Kluwin (1996), a great deal of informal assessment of vision problems should be completed by the school personnel. Teachers and other school personnel should note behaviours that might indicate a vision loss or any change in the vision of the child. However, for the teachers to be able to perform this kind of assessment, they need to be made aware of the behaviours to look out for (Flax, 2006).

According to WHO (2005), every year, an estimated 2000 children across Africa develop visual problems. The major challenges in preventing visual loss in Africa are mainly delayed detection, incomplete treatment and lack of follow-up. Other factors include lack of awareness about visual problems and their potential effects at personal, family, as well as community level; non-availability of and/or inability to afford services problems for testing and cultural disincentives and misconceptions about visual Ira (2008) and Barbara (2010).

As mentioned by Marge (2010), educators work hard to help children solve the cognitive problems that impede their learning. According to her, before any approaches begin to bring about improved children; schools need to address a much more basic issue affecting learning which is undetected and uncorrected visual problems. To deal with this issue, teachers require special education training to acquire the necessary knowledge and skills to successfully identify children with visual problems (Wendy, 2003). As reviewed in the literature, teachers who have knowledge and skills in special needs are better placed in identifying visual impairments in school children (Suchoff, 1990).

Marie and Ida (2010) conducted a study which involved vision screenings in various public schools in New York City. The study was devised to determine whether teachers' abilities to detect vision problems in their students could be enhanced. Students of two different grade schools were screened, in 1998-1999 and again two years later. In 1998-1999, the week before each group of students was to be screened; teachers were asked to indicate which children were felt to have visual problems. In 2000-2001, prior to the screenings, a lecture on vision and its relationship to learning was given to the same teachers who had responded two years earlier, and handouts and brochures delineating vision problems were also given to each teacher. A comparison was then made of the teachers' ability to detect vision problems before and after the teacher education.

The results showed that in the first year, 111 of 377 of children screened 29 per cent were referred. Teachers correctly identified 39 percent of the acuity problems and 29 per cent of the functional visual problems. Two years later, a total of 31 per cent of children were referred. The same teachers correctly identified 68 per cent of the children with acuity problems and 67 per cent of the functional visual problems. Conclusions of the study indicated that there was a statistically significant increase in the ability of teachers to correctly identify children with visual problems. Based on these results, the study recommended that in-service courses be given to school teachers to heighten their awareness of visual problems.

As revealed in the foregoing section, early detection of visual problems in school children requires teachers to be aware of the signs to look out for. This can only be achieved if the teachers have the necessary special education knowledge and skills related to visual impairments. To address this gap, this study looked at the special education qualifications of teachers in the selected primary schools and their ability to detect visual problems.

2.7 Supporting Children with Vision problems and Vision Loss

Dealing with the challenges of reduced vision can be frustrating to a child hence, the need for supportive services. Early identification of children who are at risk of developing visual loss is very necessary in order to provide support

through appropriate interventions. There is no dou bt that early interventions have the potential of lowering the effects of visual loss on a child and preventing their deterioration to more severe visual impairments (Kirk, et al., 2008). In extension, early interventions have significant social and economic benefits particularly because teachers, parents and their children will have improved information and skills of coping with the presence of a child with visual loss, and perhaps the child's increased eligibility for employment later in life (Herbert, 2004).

2.7.1 Early Interventions

Many of the problems linked to visual loss can managed through early detection and routine eye exams. Many conditions leading to visual loss are treatable and, in most cases, will not progress to vision loss if detected early (Borsting, 2006). It is unfortunate that many conditions associated with vision loss do not get noticed. That may be due to the asymptomatic nature of common ocular diseases, or it might be due to lack of access to healthcare, limited financial means, and/or lack of education regarding the importance of preventative eye care (Kristensen, 1997).

Vision loss in children always raises concerns about social, emotional, and educational growth and development. However, vision loss alone should not be reason enough to have lower expectations of a child's scholastic achievement.

Providing the right kinds of support, along with good interventions, can ensure that a child's education is not limited by impaired vision (Alberta, 2006). Without proper support and rehabilitation, vision loss can lead to increased dependence and burden on families, which, in turn, often leads to institutionalization of the individual.

The goal of low-vision rehabilitation is to optimize visual function (i.e., the ability to conduct day-to-day activities independent of visual acuity). Good interventions centre on helping children with visual loss to develop and maintain an optimistic outlook, helping them take a proactive approach to self-rehabilitation, and helping them achieve a sense of control over their lives (Groffman, 2006). While children cannot control the course of visual loss, they can control how they respond to changes that come along with it. Acceptance involves a realistic understanding of what the true limitations created by vision loss actually are, and what remaining capabilities exist. It means maintaining a balance between independence and assistance (Hunt & Marshall, 2002).

It takes a team approach to optimally manage children with vision loss. Optometrists or ophthalmologists have the vital role of diagnosing and managing the causative condition. Nevertheless, they must also recognize when the condition has created challenges in activities of daily living and/or quality of life (Heward, 2005). This is where the low-vision team of doctors,

occupational therapists, and counsellors trained for mobility, vocational rehabilitation, educational intervention, and information technology, can establish training protocols to maximize visual function. Additionally, psychotherapy intervention is important in the provision of physical and emotional support. Finally, it is essential to enlist help from the child's support system that is the family members and friends, to ensure the success of these interventions (Pleis & Lethbridge, 2006).

Children with visual loss form a heterogeneous group. The visual problems impact the level and type of support they need in order to function to their full capabilities. Diagnosis often requires a full ophthalmic assessment in a specialized setting which may not be available to many of the children at risk across the world (Saddine & Honeycut, 2008). However, the multidisplinary approach ensures that these children have the best chance at the best functional, educational and overall health outcome (Bodack, Hung and Krumholtz, 2010). The possibility of severe visual loss or blindness is a terrifying thing in all people. In the younger persons, there are huge issues relating to socialising, studying, and getting a job. In the older person, independent living may be jeopardised. In all persons, there may be existential questions about self-definition, fear of isolation and the possibility of depression. This needs to be acknowledged yet sensitively balanced with the reality of the condition (Hegarty, 2003).

The goal of the management of vision problems is to prepare the individual to take full advantage of the opportunities for learning (Flax, 2006). Interventions are directed toward improving visual function to its appropriate efficacious level. It is a necessary complementary intervention to maximize the learning environment and the effectiveness of pedagogy. Interdisciplinary communication, consultation, and referral are vital for the most effective management of the individual with vision problems (Scheiman, 2006).

The management of vision problems should be directed at the identification and interventions of specific visual deficits. The expectation for intervention should be the reduction or elimination of the signs and symptoms associated with particular visual deficits (Kauffman, 2004). Vision problems are usually managed by eye specialists through referrals and through school and home support to provide continuity of care (Lerner, 2006). Specific communication with the child's parents or teachers should occur after the examination by specialists to review the test outcomes. An explanation of the nature of the vision problem and its relationship to the presenting signs and symptoms is necessary (Optometric Clinical Practice Guidelines, 2006).

The management plan and prognosis should be presented to the child and parents. Communication with education professionals about the diagnosis,

proposed management plan, and expected outcomes should be initiated. This should lead to a coordinated effort with the child's classroom teachers, special education teachers, and therapists (Swamson, 2006). The importance of continuing eye care should be discussed with parents or caregivers. Other education and health care professionals should be informed about the presence and nature of the vision problems and their relationship to extant learning difficulties (Cotter, 2006).

2.7.2 School Supportive Measures

Schools are expected to adjust for individual needs of children showing signs of visual loss by modifying factors in the school environment. The focus is on adapting the learning environment or the academic requirements so that the children may learn in spite of the visual loss exhibited (Hoffman, 2006). Modification of the classroom environment, the curriculum and the teacher's instructional behaviours are important measures to be considered. This may involve the use of modified instructional techniques, more flexible administrative practices, modified academic requirements, or provide modified or alternative educational processes. Most regular classroom teachers are interested in teaching subject matter while special educators are interventionists, most often interested in remediation or correcting underlying problems (Baraga & Erin, 1992).

Reasonable accommodations that make it possible for a child with a visual impairment to have an equal opportunity are determined on a case-by-case basis by evaluating obstacles or barriers interfering with the child's access to the classroom, instruction, or performance; and, determination of accommodations that can either remove or reduce the effects of obstacles or barriers. However, curriculum modification must be functional and age-appropriate (Garzia, 1996). The school administration can address clear and appropriate policies regarding children with visual difficulties which can be written and disseminated to parents, children and teachers. Inclusion can be more readily implemented in a school where it is clear that the school administration supports the policy. The administration can also support in-service training for teachers teaching children with visual difficulties so as to improve the education quality (Ainscow, 1994).

According to UNESCO (2005), teachers can use technology and media in classrooms to support their presentations. Any kind of visual information presented by the teacher to accompany the lesson like graphics, actual scenes or dioramas, pictures, and large text fonts can facilitate understanding and comprehension, as well as help hold attention. Technology in the form of computers and low-vision optical and video aids enable many learners with visual loss to participate in regular class activities. Teachers use specialized equipment such as computers with synthesized speech, interactive educational software programmes, and audiotapes to assist children. The more the inputs

used, the better the chances that the child will be given structures for cognitive frameworks of knowledge (Hunt & Marshall, 2002).

As affirmed by Hartman (2001), special education teachers help to develop an Individualized Education Program (IEP) for each child receiving special education. The IEP sets personalized goals for the child and is tailored to that child's individual needs and abilities. When appropriate, the programme includes a transition plan outlining specific steps to prepare children for high school or, in the case of older students, a job or postsecondary study (Zindi, 1997). Teachers review the IEP with the child's parents, school administrators, and the child's general education teachers. Teachers work closely with parents to inform them of their children's progress and suggest techniques to promote learning outside of school. Special education teachers design and teach appropriate curricula, assign work geared towards each child's needs and abilities. They are involved in the child’s behavioural, social, and academic development, helping them develop emotionally and interact effectively in social situations (Hallahan & Kauffman, 1994).

Since schools have become more inclusive, special education teachers and general education teachers increasingly work together in general education classrooms. Special education teachers help general educators adapt curriculum materials and teaching techniques to meet the needs of children with

disabilities. A large part of a special education teacher's job involves communicating and coordinating with others involved in the child's wellbeing, including parents, social workers, school psychologists, occupational and physical therapists, school administrators, and other teachers (Marge, 2010).

Gottfried (1995) points out that special education teachers work in a variety of settings. Some have their own classrooms and teach only special education children; others work as special education resource teachers and offer individualized help to children in general education classrooms; still others teach together with general education teachers in classes including both general and special education children. Some teachers work with special education children for several hours a day in a resource room, separate from their general education classroom (Jason, 2009).

As children with disabilities increase in number, general education teachers need to understand the effect that disabilities have on school children. Such understanding will allow them to make appropriate accommodations and adaptations for the children (Hastings, 2003). General education teachers who are aware of the implications of visual impairments on students' learning will be able to provide their students with educational opportunities that will lead to successful academic and social experiences. Teachers can appropriately teach

students with visual impairments in general education settings but must be informed about children's visual abilities (Desmond, 2012).

Another important aspect is to design effective learning environments through collaboration with vision specialists. Children with visual impairments in general education classes usually get support services from a vision specialist (Heward, 2005). Such topics as learning through other senses, instructional and curricular adaptations, and appropriate resources and materials are the domain of vision specialists. General educators will find these professionals a valuable source of information and assistance that will help them capitalize on students' abilities (Bailey, et. al., 2006).

In the classroom, pathways should be unobstructed, books, bags, and other personal items are properly stored and areas often used by children be readily accessible (Karchmer, Mallette, Kara-Soteriou & Leu, 2005). The children should be familiarized with configuration of desks; and the teacher should repeat or inform them each time configuration changes. Other classroom strategies and adaptations include bold-line paper, felt-tip pens with high-contrast colours, supplementary light source like desk lamp, magnification device, book stand, cassette tape recorder/player, sun visor or light shield to reduce glare, large print reading materials (Lewis & Allman,2000). Instructional strategies that can enhance learning include having child sit closer

to see board, give student copies of teacher notes, read notes aloud while writing them on board, provide audio tapes of reading material, allow student to turn in taped rather than written responses, enlarge books, worksheets and provide opportunities for hands-on learning (Kristensen, 1997).

The general education teachers should collaborate with other specialists who might work with children and learn about children's strengths/weaknesses and academic needs, become familiar with individualized education programmes (IEP) goals and objectives and other services specified to be provided to ensure that children are receiving appropriate services and accommodations (Smeeth, 2000). Vision specialists can help determine what goals and related services should be included on the individualized education programme (IEP) of the children, as well as what types of accommodations are needed in the classroom. General educators who consult regularly with vision specialists are better able to fashion learning experiences appropriate for their students (Zindi, 1997).

Many options are available for teachers selecting reading and writing materials for children with visual loss. According to their needs and preferences, children may use printed materials which should be clear and printed using an easily readable font (Karchmer, Mallette, Kara-Soteriou & Leu, 2005). Black felt-tip pens and soft lead pencils are useful writing tools for children with visual

impairments because of the increased amount of contrast they create against white writing paper (Koenig, 1996). An extra light source at the child's work area can be helpful for children with poor vision (Heward, 2005).

Some simple strategies for using printed materials can help children with visual loss learn visually without requiring huge adjustments to the classroom environment. Simply holding books or other materials closer is enough to help some children with visual impairments (Heward, 2005). Using magnification devices or large print materials are two accommodations that are often implemented in the classroom (Barraga & Erin, 1992). Such equipment and materials should be availed for children who need them. The child's position in the classroom in relation to visual presentations should allow for an unobstructed view. If necessary, the child should be allowed to move to a position with a better viewpoint when visual materials are being used. Information written on the chalkboard should be large. Appropriate seating is extremely important for children who are able to use their existing vision. Placement of the child's desk, lighting, glare and distractions should be considered when situating such children in the classroom (Lueck, 1999).

2.7.3 Technological Support

A variety of assistive technology (AT) devices can help children with vision impairment perform many daily life activities (Koenig, 1996). The goal of AT should be for the child to be able to function at a higher level of efficiency. AT devices can be either low technology or high technology. Students with visual impairments may need a variety of specialized materials and equipment in order to function effectively in the school environment as described by Brazier & Jennings, (1999) and Campbell & Oliver (1996).

Magnifying devices can be used to enhance the size of print on the page and on the blackboard, and they can be used to make the details in near and distant objects more visible (Karchmer, Mallette, Kara-Soteriou & Leu, 2005). Children using magnifying devices may experience decreased reading speeds because of the reduced visual field. Some older children, generally from grade 5 onwards, should be encouraged to become proficient in the use of magnifiers because they provide access to a variety of regular print materials. Various hand-held, pocket and stand magnifiers that can assist students are available. If a child with low vision needs extra illumination, various desk lamps, preferably with rheostat control, are available (Brazier & Jennings, 1999).

Audiocassettes provide the student who has severe visual impairment with an alternate learning mode. The child should be taught active listening, which is

listening intently to the audiocassette to pick out the main ideas and make short study notes. A print or braille copy of new vocabulary on cassette should be provided so that the child will learn the spelling of new terms and names. With experience, the child will be able to take advantage of the compressed speech feature on the recorder and listen to the tape at an increased speed (Kristein, 1997).

The use of computers is particularly important to visual loss, as their ability to use written communication can be enhanced and access to information improved. The selected computer hardware and software should be specific to student's individual needs, considering the children's short and long-term educational goals and objectives. According to Scheiman (2006), appropriate selection of devices and technology, and subsequent training, is crucial for ensuring proper use of such devices. It should be remembered that software and hardware must be compatible, and that systems used at home and at school need to be coordinated for efficient transfer of homework assignments (Lam & Goh, 1999).

A computer system for a child with severe visual loss will include a computer or laptop with some important components. The screen reader/speech synthesizer provides auditory feedback when using the keyboard as well as auditory access to information displayed on the monitor (Anstey & Bull,

2006). These systems consist of a software program and speech synthesizer. The software program sends information from the computer to the synthesizer, where phonemes are combined into words and the words are spoken. Most systems allow choices in volume, voice quality and speed of output. Children with limited or no reading vision will find these devices useful, especially when connected to braille and regular printers for output (Turnbull, et. al., 2002).

Cassette recorder can be used as writing tools as well as reading tools. Children with vision loss can benefit from the use of cassette recorders. Useful features of specialized cassette recorders include play and record at variable speeds, play and record on two tracks per cassette side, tone indexing (insertion of a beep to mark a section of text), tactile markings on control keys operate on regular current and rechargeable batteries; and built in microphone and earphone attachment (Anstey & Bull, 2006).

Low technology adaptations include keyboard access which can be maximized through the use of enlarged keyboard labels and tactile indicators. Non-optical adaptations for improving access to the screen display include adjustable lighting, polarized screen filters and monitor hoods to reduce glare, adjustable document holders and adjustable computer stand for close viewing Anstey, M., & Bull, G. (2006). Whereas the foregoing section describes various ways

of supporting children with vision loss, this study established that public primary schools in Central Kenya lagged much behind in providing this kind of support. Nevertheless, the study endeavoured to come up with special education interventions that could be put in place to cater for these children.

2.8 Summary of Reviewed Literature

From the foregoing literature, it is clear that in most developed countries, there are long-standing programmes of screening and surveillance for early detection and provision of support for potentially visually impairing conditions in children. Evidently, insufficient research has been done in Kenya in the area of early identification and support for school children with vision problems. Indisputably, when children with uncorrected vision problems are not identified or supported appropriately, the consequences will be poor school performance, potential increase of visual impairments and overall personal and community cost. Early identification and support of school children with vision problems produces better outcomes and improves quality of life.

The literature reviewed lucidly pointed out that visual impairments in children are common and have a profound impact on a child's social, emotional, and physical development. Findings from several studies indicated that most of the visual problems could be corrected and improved drastically if only identified

early. The current study identified gaps that could have contributed to the failure towards this achievement and tried to uncover reasons why vision problems in children still remain unidentified and unsupported in Kenyan public primary schools. The literature has reviewed supportive measures for persons with visual impairments particularly those pertaining to technology. Suffice to say, these are widely available in developed countries whereas, in the developing countries like Kenya, they are still not fully available.

The findings of this study are, therefore, a purposed attempt to promote early identification and early support for children with vision problems. This study therefore endeavoured to identify children with vision problems, explored constraints teachers encounter in identifying and supporting children with vision problems and coming up with supportive measures. The subsequent chapter discusses the methodology which was followed in carrying out the study.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter presents in detail the basic methodological orientation that was used in this study. The chapter dealt with research design, location of the study, sampling procedures and sample size together with tools that were used for data collection.

3.2 Research Design

This study adopted descriptive research design which was found appropriate because it involved observing and describing characteristics of subjects in details without influencing them in any way. The research design helped in achieving the main goal of the research regarding early identification of children with vision problems and how they could be supported. It involved gathering data that addressed the study objectives, organizing, tabulating, depicting and describing the data collected (Creswell, 2007 and Clark & Cresswell, 2008). In this study, descriptive research used visual aids such as graphs and charts to aid in understanding the data distribution. Because the human mind cannot extract the full import of a large mass of raw data, descriptive statistics are very important in reducing the data to manageable form (Denzin & Lincoln, 2005). This research used description as a tool to

organize data into patterns that emerged during analysis. Those patterns aided in comprehending the qualitative study and its implications.

This study utilized qualitative methodology which helped in understanding the main issues under investigation (Mertens, 2007 & Gay, Mills & Airasian, 2008). Qualitative methodology was helpful in gathering data to address the research objective of identifying children with different types of visual problems. This was made possible by using vision problem checklists and visual acuity checker tools which consisted of structured items that aimed at identifying certain characteristics of respondents (Denzin & Lincoln, 2005).

Qualitative data were also derived from interviewing participants (Creswell, 2007). The general, open-ended questions asked during interviews allowed the participants to supply answers in their own words. The analysis of the qualitative data typically followed the path of aggregating the words into categories of information and presenting the diversity of ideas gathered during data collection (Creswell & Plano, 2007). The research objectives that addressed qualitative aspects of the research included: examining special education teachers qualifications and ability to identify children with visual problems, finding out how teachers supported children with visual problems, establishing teachers' constraints in identifying and supporting children with

visual problems as well as exploring ways of promoting identification and support of children with visual problems.

3.3 Locale

The study was conducted in Kiambu, Murangá and Kirinyaga counties of Central Kenya. Kiambu County is adjacent to the northern border of Nairobi and has an area of 2543 km². It borders Murang'a County to the North and North East, Machakos County to the East, Nairobi and Kajiado counties to the South, Nakuru county to the West, and Nyandarua County to the North West. Murang'a County borders Nyeri County to the North, Nyandarua to the West, Kiambu to the South and Kirinyaga County to the East. Murang'a County has an area of 1798 km². Kirinyaga County has an area of 1,478 km². It borders the following counties: Meru to the North, Embu to the North- East, East and South, Murang'a to the South West and Nyeri to the West (See Appendix 6).

The choice of the study site was influenced by the fact the counties are endowed with numerous public primary schools which the study targeted. Most children in public primary schools come from low- middle income family backgrounds with a fairly fragile economic base to afford specialized visual checkups. The above factors coupled with consideration of time, fieldwork costs and accessibility to research sites made the choice logistically convenient for carrying out this study. The characteristics of the children in

the targeted public primary schools resemble those of other children in other Kenyan counties. This could therefore imply that the findings, conclusions and recommendations of this study could be generalized to other public primary schools in Kenya.

3.4 Target Population

According to Creswell (2007), a target population is a group of individuals with some common definitive characteristics that a researcher can identify to study. This study targeted classes 2 and 3 children, the class teachers and head teachers from public primary schools in Murang'a, Kiambu and Kirinyaga Counties.

3.5 Sampling Techniques and Sample Size Determination

The subsequent section explains the sampling techniques that were used in the current study and also describes how the sample size was constituted.

3.5.1 Sampling Techniques

In this study, convenience sampling technique was used to select 12 public primary schools from Kiambu, Murangá and Kirinyaga counties in Central Kenya. This sampling method was found fit for the study because the regions are endowed with many rural and urban schools conveniently located for sourcing the respondents. In addition, it maximized the time available for

collecting data since the researcher was on full- time employment. Convenience sampling was also desirable because it is a sampling technique where selection is based on the convenience in accessibility and proximity to the researcher.

From each county, two rural schools and two urban schools were selected, giving a total of six rural schools and six urban schools. The reason why both rural and urban public schools were selected was to target respondents from different learning backgrounds and to have more balanced data related to the study. Table 3.1 shows the different rural and urban schools that were involved in the study.

Table 3.1: ***Selected Rural and Urban Primary Schools***

County	**Rural Schools**	**Urban Schools**
Kirinyaga	Riandira Rukanga	Makutano Kaminji
Murangá	Mukerenju Kiunyu	Kariguini Mukerenju
Kiambu	Juja Farm Kisiwa	Jamhuri Heshima

The classes that participated in the study were classes 2 and 3. From each school, one standard two class and one standard three class were selected. In case a school had more than one stream, simple random sampling through tossing of the coin was used to decide on the class to participate. Simple

random sampling was found favourable because it allows each unit of the population to have an equal chance of being selected for the sample (Ader, Mellenbergh, & Hand, 2008).

In this study, purposive sampling was used in selecting the participants. In purposive sampling, the subjects are chosen according to a certain specified criteria and it allows the researcher to use cases that have the required information with respect to the objectives of the study (Creswell & Plano, 2007). Children in classes 2 and 3 were purposively selected based on the criteria that the study targeted early identification of visual problems in primary school children. These children were in their early years of primary schooling thus, the researcher felt that it was the best time for identifying those with visual problems since they could understand the study instructions with ease. Suffice to mention, academic instruction at this early age places relatively greater demands on visual information.

The head teachers and the class teachers were also selected purposively because they constantly interacted with the children on day- to- day basis during the teaching/ learning process and other school activities. In such interactions, the teachers get the opportunity of observing different visual problems exhibited by the children. Consequently, the teachers provided first-hand information regarding any visual problems they had observed, challenges

they encountered in identifying and supporting those with visual problems as well as what could be done to counter the challenges.

Simple random sampling method was used to select five boys and five girls from each class, which was done through the assistance of the class teachers. Children who have visual problems have been documented to perform poorly academically. As noted in the literature reviewed (Section 2.3), children with visual problems have been documented to perform below their academic potential. Therefore, to increase the chances of capturing children who had visual problems, this study targeted those who performed poorly academically. To achieve this, the teachers were asked to randomly select five boys and five girls in their classes who had persistently been performing poorly.

3.5.2 Sample Size

According to Fraenkel and Wallen (2008), a sample is a group on which information is obtained in order to generalize it to the population. In this study, the sample was derived from children in classes 2 and 3 from public primary schools in Kiambu, Murangá and Kirinyaga Counties. The sample comprised 240 children, 24 class teachers and 12 headteachers giving a total sample size of 276 respondents as shown in Table 3.2.

Table 3.2: ***Sample Distribution***

Schools	**No. of Respondents**		
	Children	C/Trs	H/ Trs
Juja farm	20	2	1
Kisiwa	20	2	1
Riandira	20	2	1
Rukanga	20	2	1
Mukerenju	20	2	1
Kiunyu	20	2	1
Makutano	20	2	1
Kaminji	20	2	1
Kariguini	20	2	1
Kimorori	20	2	1
Jamhuri	20	2	1
Heshima	20	2	1
TOTAL	**240**	**24**	**12**

Key: C/trs- Class teachers; H/trs- Head teachers

3.6: Research Instruments

The study utilized three research instruments (Interviews, vision problem identification checklist, Visual Acuity Checker) in data collection. This was necessary since the use of a single method or instrument may provide a limited view of the complexity of the phenomenon under study. Thus, a holistic picture of the phenomenon may not be presented by a single method but by relying on a variety of instruments that would enrich the depth and accuracy of the data collected (Creswell, 2007). This is because each method or instrument has its own limitations that could be minimized by use of more than one method. The study on early identification of impaired vision in children would elicit varied data from the teachers and the learners. Given this fact, the use of

varied instruments to collect data on the same issue from the informants was a step towards clarifying and validating the information obtained (Merriam, 1998).

3.6.1 Interview Guides

Semi- structured interview guides were constructed for administration to the participating head teachers and the class teachers. The interview guide approach intended to ensure that the same general areas of information were collected from each interviewee. This aimed at allowing a degree of freedom and adaptability in getting the required information for the study. Gall, Bong & Gall (1996) assert that semi-structured interviews involve asking a series of structured questions and then probing more deeply using open form of questions to obtain additional information that was vital for the study. From time to time, the interviewer guarded against confusion of the questions through clarification, adapting or simplifying, thus, helped the respondents in giving the relevant responses.

Interview schedules were constructed to facilitate a direct face-to-face verbal response from the teachers. The items were such that they allowed the interviewer to clarify questions, allow the informants to respond in any manner they see fit, allow the interviewers to observe verbal and non-verbal behaviour of the respondents. The interview schedules had two sections.

Section One comprised the demographic details of the teachers like how long they had taught their classes (years) and their special education qualifications. In Section Two, the study derived key information related to the visual problems the teachers had been able to identify among the children, challenges they faced in identifying and supporting children with visual problems and also how they supported children with visual problems. Finally, the study sought the teacher's views on ways of promoting identification of children with visual problems.

3.6.2 Vision Problem Identification Checklists

A vision problem identification checklist was constructed (adapted from P.A.V.E, 1996) which comprised two sections: the first section included the learners' personal details like name, school, class and gender. The second section comprised questions defining the specific nature of commonly occurring vision Problems (Appendix 3). Sufficiently detailed descriptions of visual symptoms were obtained directly from the child or class teacher. This was necessary to avoid an underestimation of the severity of the symptoms. Vision problem identification tool was chosen because it is easy to score, interpret, tabulate, and summarize data. The visual problem checklist was in a 3- Point Scale with the options ranging from Never=0, Sometimes=1 and Often=2, based on how frequent the visual problem symptoms occurred. Table 3.3 show a sample of the items that were included in the visual problem identification checklist.

Table 3.3: ***Sample visual Problem Identification Checklist***

Visual Problem Symptom	**Frequency of occurrence**		
	Never (0)	Sometimes (1)	Often (2)
Stumbling on objects when walking	_	_	_
Holds book too close when reading/ close one eye when reading	_	_	_
Omission of letters and words when reading	_	_	_
Frequent blinking of eyes	_	_	_
Follows line with finger when reading	_	_	_
Unwillingness to engage in reading tasks	_	_	_

3.6.3: Visual Acuity Checker

A standardized Snellen chart was administered to the participating children to determine the visual acuity from each eye. The Snellen chart was found favourable for the study because it is inexpensive effective for determination of distance visual acuity Ruttum, (2006). This instrument was printed with lines of block letters. The first line consisted of one letter and the subsequent rows had increasing number of letters that decreased in size. Each row presented different values of visual acuity as illustrated in Figure 3.1.

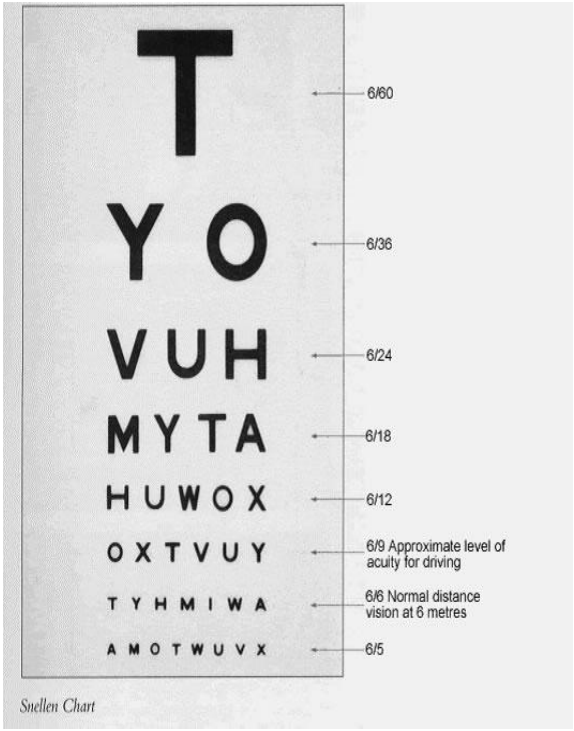


Figure 3.1: **Optotypes and Values in Snellen Chart**

(Source: Carlson & Nancy, 2004)

3.7 Pilot Study

The research instruments (Interview guides, Vision Problem Identification Checklist and Visual Acuity Assessment Tool) were pre-tested in a public primary school selected from Nyeri County, Central Kenya. Nyeri County served the purpose of piloting because it had similar characteristics as the counties under study, all being in Central Kenya. Piloting was necessary because it helped the researcher in gaining practice in the administration, collection and scoring of the instruments before conducting the main study. The researcher was also able to establish the reliability of the instruments before their administration in the main study The pilot study was also essential

in reviewing the items in the research instruments through re-wording, re-scaling, shortening or revising items when necessary (Peat, Mellis, Williams and Zuan, 2002).

3.7.1 Validity Determination

Validity refers to the extent to which a concept, conclusion or measurement is well-founded and corresponds accurately to the real world (Ader, Mellenberg and Hand, 2008). Additionally, it represents how well an instrument measures what it is supposed to measure. To ensure validity of the instruments, triangulation method was applied. Triangulation method minimises the inadequacies of a single source research and enhances the credibility and validity of results (Bodgan & Bilklen, 2006 and Altrichter, 2008). Thus, in this study, mixing of data from teachers, head teachers and school children (informant triangulation) revealed diverse viewpoints or standpoints and cast light upon the topic under investigation. Methodological triangulation was also used whereby different methods were employed to gather qualitative data (Interviews, Visual Problem Identification Checklist and Visual Acuity checker). This helped to ascertain the correctness of the information got from the various instruments. However, during the study, some of the items in the visual problem checklist were modified to as to capture characteristics relevant to children in Kenyan public schools.

To further determine validity in this study, panels of judges competent in the area of visual impairments were requested to assess the relevance of the content used in the instruments developed. They examined the instruments individually and provided feedback to the researcher. Their feedback and recommendations were incorporated in the final instruments that were used in the main study. Piloting the instruments so that their content, wording and length could be refined to suit the samples targeted further enhanced validity.

3.7.2 Reliability Determination

In the calculation of the reliability coefficient, the research used Cronbach Coefficient alpha that determined how items in the research instruments correlated among themselves. According to Clark & Cresswell (2008), Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. Cronbach's Alpha is a general form of the Kunder- Richardson (K-R) 20 formula. In the application of K-R 20 formula, a high coefficient (above 0.75) implies that items correlate highly among themselves; in fact there was consistency among the in items in measuring the concept of interest (Mugenda & Mugenda, 1999). This formula was appropriate for this study because the items which were used were structured items that had several possible responses and each could be given a different weight. The raw data obtained by the instrument was converted to numerical codes representing the measurement of the variables. This coding facilitated for the determination of reliability. The Cronbach co-efficient Alpha was then

computed to determine how the items correlated. The Cronbach alpha coefficient was found to be 0.887. This high coefficient implied that the items correlated highly among themselves. This suggests that there was consistency among the items in measuring the concepts of interest. The use of standardized Snellen chart was based on the fact that it is a highly reliable and universally accepted instrument which is used in many different settings like hospitals and schools for testing visual acuity. In a study done by Veryloed (2001) using the Snellen chart, Cronbach's alpha showed a high degree of reliability and internal consistency of 0.929. The Snellen chart therefore increased the reliability of the quantitative part of the data. Further, the reliability of the research data was contributed by ensuring adherence to the standardized procedures and scoring criteria.

Additionally, to obtain high quality measurements of visual acuity, a written protocol on how to administer and score the tests, attention to adequate lighting and necessary distances between the participant and the charts, standard instructions on amount of prompting and encouragement to be given to ensure that participants had the best chance to attempt the letters. Training and quality control of research assistants were absolutely essential to ensure reliable results.

To further increase the reliability of the research, the study enhanced research worker reliability (Babbie, 1997). To ensure this, the research assistants were involved throughout data collection and were adequately trained to record events, collect data, and conduct interviews in an identical manner with the researcher. Additionally, as recommended by (Kvale, 1996), the instruments were administered by both the researcher and the research assistants who constantly held consultations to ensure consistency in the procedures.

3.8 Data Collection

Data were collected in the 12 public primary schools during the first term of January, 2012. The researcher, assisted by two research assistants made the initial visits to the participating schools and endeavoured to meet the head teachers to brief them about the intended study and create rapport. In all occasions, the researcher introduced the research assistants so that they could as well get permission to operate in the schools during the study. During the visits, the permit for the intended study was presented to the head teachers when need arose. In these visits, the researcher addressed the participating teachers regarding the aims of the study. Agreements were arrived at on the dates the research would be carried out through the guidance of the head teachers.

Data were collected with the help of the research assistants who underwent two- day training. The purpose of the training was to enable them to

familiarise with the study, test items, methods of administration and also get instructions on the administration of visual acuity test. This preparation aimed at reducing the variance in the data collected by the researcher and the research assistants.

The data were collected during first term, four weeks after the schools opened. This facilitated data collection because the children had already settled in their new classes, being the beginning of the school year. Using the various research instruments already described, all the data collected were recorded manually by the researcher and the research assistants. To facilitate comprehensive data collection, the researcher and the research assistants took three days in every school. The following section provides the information on the procedures that were used by the researcher and the research assistants during the administration of the various instruments.

3.8.1 Administration of Interviews

The administration of interviews to both the head teachers and the class teachers strictly avoided interference with the regular teaching and learning. The interviews with the head teachers were administered by the researcher in the offices depending on the date and time agreed with the researcher. For the class teachers, the interviews were either administered in the staffroom, vacant classrooms or in other special office space made available by the teachers. The

class teachers interviews were either conducted by the researcher, the research assistants and sometimes the researcher could interview while one of the research assistants took down the notes.

3.8.2: Administration of Visual Problem Identification Checklist

The class teachers were given visual problem checklist for the participating children in their classes. The visual problem checklist had 12 structured items in a three- point scale reflecting the frequency of occurrence of the visual problems (Never=0, Sometimes=1, Often=2).Following the researcher's guidance, individual children were assisted by the teacher (where necessary) to respond to the items as they were read out. The researcher recorded (through ticking) the responses on individual participant checklists. In the current study, any visual problem occurring 'often' was considered as a possible indicator of visual loss (National Institute of Health, 2013).

3.8.3 Administration of Visual Acuity Checker/ Snellen Chart

Visual acuity testing was administered to the respondents, one at a time. Before administration, the researcher made several preparations:

Selection of a screening site: In planning for vision screening, attention was given to the room selection in which to administer the test. It was important to consider normal lighting and avoid undue glare. Since children are easily distracted, it was advisable to select a room that was quiet and free from

interruptions. The room needed to include appropriate space to set up screening instruments including proper hanging of the snellen chart. Where possible, a waiting area was provided for those children awaiting screening. These requirements were not always available in all the participating schools, predominantly those in the rural areas. However, in the schools where there were no available free rooms, teachers were cooperative and sometimes they combined classes to provide room for the assessment. Overall, in three schools, administration of the instrument was done in the field due to unavailability of rooms.

Explanation to the children: During the study, it was important that children understood the purpose of visual testing, and their role in the activity. The researcher and research assistants explained the purpose of visual testing, and demonstrated screening procedures prior to the screening for all participating children. During the procedure, instructions to the children were made simple and clear. Children were told they may not be able to see everything. They were also made to understand that they must tell when they cannot see the letters or symbols. The use of the word test was avoided because "test" implies the "need to pass". Using the term "vision testing" was preferred to prevent children from attempting to guess when they were unable to see the letters or symbols.

Observations of the children: When a child was scheduled for visual testing, the researcher noted any major visual characteristic before the testing. A distance of 20 feet was measured using a tape measure between where the child

sat and the snellen chart. An occluder was used to cover the eye not under test. This was either done by the research assistant or the participating child. Care was taken to ensure that the child was not peeping around the occluder. A pointer was used to attract the child's attention to the letter or symbol to read on the snellen chart. The children read the letters on the chart from top to bottom moving across the line from left to right as directed. When the first line was read correctly, the researcher proceeded to the next smaller line. This continued as long as the child could identify the letters. If the child failed to read a line, the line was repeated in the reverse order. If the line was failed twice, the visual acuity was identified as the next higher line read correctly. For example, if the student failed on the 20/30 foot line, the visual acuity was recorded as 20/40. Each eye was tested at a time and the visual acuity results recorded. Figure 3.2 shows some children during visual acuity testing.

Figure 3.2: **Children during Visual acuity Testing**

3.9 Data Analysis

Data analysis is a process during which the researcher brings order, structure and meaning to the data that were gathered (Gorman & Clayton, 2005). Similarly, Kane (1995) looks at data analysis as categorizing, manipulating and summarizing of data in order to obtain answers to research questions. In this study, data analysis involved both qualitative and quantitative data. In this study, qualitative data were organized and prepared for analysis through coding of class teachers in class 2 and 3 and head teachers. This was followed by transcription of the interviews. The researcher read through all the data in order to obtain a general sense of the information and to reflect on its overall meaning. This helped the researcher to know the general ideas of the participants in relation to their overall depth, credibility and use of the information. The data were organized so as to bring meaning to them. This was followed by putting data into categories/ themes for analysis (related to the research objectives). The researcher used narrative passage to convey findings of the analysis. She used detailed discussions of several themes and sub- themes.

This study found it necessary to quantify qualitative data which was obtained from the vision problem checklist and the visual acuity checker. The quantitative analysis approach assigned numerical values to observational data in a way which maximized the relation between the observations and the data analysis model while respecting the measurement character of the data. The

major objective was that this approach provided conclusions that were applicable to the target population and allowed generalization of results from the data analysis to be meaningful.

Quantitative methods of data analysis was also a beneficial aspect in that it provided the means to separate out a large number of confounding factors that often obscured the main qualitative findings. For example, frequency of occurrence of various vision problems among the participants and percent numbers of children with various vision problems. The complex nature of inter-relationships between variables required some degree of quantification of the data and a subsequent analysis by quantitative methods. Once quantifiable components of the data were separated, attention was then focused on characteristics that were of a more individualistic qualitative nature.

This study aimed at identifying children with vision problems and the information was collected in vision problem checklists and visual acuity measurement forms. Quantitative analytical approaches enabled identification of vision problems that frequently occurred across the participants, reporting summary results in numerical terms like percentages that yielded tables and graphs which were analyzed descriptively (Analyzing data involved examining the information collected in ways that revealed the relationships and patterns within it. Data was analyzed by subjecting it to graphical displays and statistics that demonstrated relationships among variables). Thus, the value of

quantitative analysis aimed at studying specific research themes through coding into major categories and then discussing more easily, unhindered by the quantitative components.

3.10 Logistical and Ethical Considerations

The Permission to carry out this study was sought for, and obtained from the Permanent Secretary in the Ministry of Higher Education, Science and Technology through the Dean, Graduate School of Kenyatta University. This was followed by visits to the District Education Officers concerned who gave permission to visit the sampled schools. Each participating school was visited to establish rapport and also explain the purpose of the study. A letter explaining the purpose of the intended study was given to each school.

The principle of voluntary participation was applied whereby the respondents were not coerced into participating in the research. Since the study involved young children (class two and three pupils), informed consent was obtained from the head teacher before engaging them in the study. All the participants were guaranteed of confidentiality and anonymity by assuring them that the information given was not to be made available to anyone who was not directly involved in the study. During data collection, school activities were respected by ensuring that there were minimal disturbances and disruptions during teaching/ learning.

3.11 Summary

Chapter Three has outlined research procedures that were followed to gather and analyze data related to early identification of children with vision problems in Public Primary Schools. The next Chapter will present the data collected, interpretations and discussions.

CHAPTER FOUR

FINDINGS, INTERPRETATIONS AND DISCUSSIONS

4.1 Introduction

This chapter presents findings, interpretations and discussions of data that were gathered during the study. An endeavour was made to present the contents within the framework of the objectives that this study sought to address. The chapter was organized into the following themes: a) teacher's demographic characteristics, b) vision problems exhibited by children, c) extent of vision loss in children, d) how teachers supported children with vision problems, e) teachers' constraints in identifying children with vision problems, f) teachers' constraints in supporting children with vision problems, g) Teacher's views on promoting identification of children with vision problems.

4.2 Teachers' Demographic Characteristics

Demographic data were collected from 12 head teachers and 24 class teachers from 12 public primary schools (6 urban schools and 6 rural schools) in Kiambu, Murang'a and Kirinyaga Counties. The demographic characteristics were analyzed along variables such as special education qualifications, area of specialization and the number of teaching years as summarised in Table 4.1.

Table 4.1: ***Teachers' Demographic Characteristics***

Variables	**Head teachers**		**Class teachers**	
	No.	%	No.	%
No of Teaching Years				
Below 1 year	0	0	4	16
1-2 years	4	33	11	46
Above 2 years	8	67	9	38
Total	12	100	24	100
Area of Specialization				
Visual Impairments	0	0	1	4
Others	2	17	5	21
No specialization	10	83	18	75
TOTAL	12	100	24	100

Table 4.1 shows that the number of years the head teachers/teachers had taught in their school/ class was categorized under: below 1 year, 1-2 years or above 2 years. This categorization was based on the argument that the longer the period of teaching; the more likely the teacher would notice persistent vision problems exhibited by the children. In this study, none of the head teachers had taught in the school below 1 year, nearly half of the class teachers (46%) had taught for 1-2 years, 38% had taught for over 2 years and only a few class teachers had taught below one year. These findings gave a clear indication that majority of the head teachers and the class teachers had interacted with the children long enough during teaching, hence were in a better position to notice any persistent visual problems exhibited by the children.

Item 2 in the interview schedule gathered information on the teacher's special education qualifications and the area of specialization. Since this study was based on visual impairments, findings were tailored towards teachers with relevant qualifications. Study findings indicated that over three quarters of the head teachers had no special education qualifications at all and none had specialized in the area of visual impairments. On the side of the class teachers, three quarters of the class teachers had no special education qualifications and only one teacher had a degree in special education in the area of visual impairments. These findings reveal a lack of specialists in special education, and more specifically in the area of visual impairments.

It is worth noting that teachers who have adequate knowledge and skills about visual impairments stand a better chance of identifying children with visual problems as opposed to those without. However, the results of this study showed that most teachers lacked the relevant special education qualifications to enable them to identify children with vision problems and come up with relevant interventions. This study therefore, exposed the dire need for special education training (particularly in visual impairments) for teachers to equip them with the relevant knowledge and skills. The necessity for special education training courses for teachers is backed by the reviewed literature (Wendy, 2003; Groffman, 2006 & Flax, 2006, Criss, 2009 & Zindi, 1997). However, the findings of this study contrast with findings from a study conducted in Uganda by Steve, Ben and Cathrine, (2005) which provided

interesting insights on the profile of the teachers teaching children with visual impairments. In the study, more than 80% of the teachers had special education qualifications.

4.3 Teachers ability to Identify Visual Problems

One item in the interview schedules asked head teachers and teachers to mention the visual problems they had identified among the children. However, there was need to explain to the teachers what visual problems embraced for them to be able to enumerate the ones they had identified among the children. The visual problems that the respondents mentioned included tearing eyes, red eyes, painful eyes, close reading, not seeing chalkboard clearly, itchy eyes and squinted eyes. From the sentiments of respondents, some vision problems were easily identifiable while for others, they experienced difficulty in identifying unless the children concerned reported them. Table 4.2 shows how the teachers rated their ability to identify visual problems amongst the children.

Table 4.2: ***Level of Difficulty in Identifying Vision Problems***

Level of Difficulty	Head teachers(N=12)	Class teachers(N=24)
Very Difficult	2(17%)	7(29%)
Moderately Difficult	8(66%)	16(67%)
Easy	2(17%)	1(4%)

According to the data summary in Table 4.2, 7(29%) class teachers said that they found it very difficult to identify visual problems in children while over half of the class teachers said that it was moderately difficult. Among the participating head teachers, 2(17%) said it was very difficult to identify and 66% of the head teachers said it was moderately difficult. During the interviews, it became clear that the teachers were not aware that what they had noted in children were clues of possible vision problems. According to them, what the children experienced were just allergies or other simple illnesses which needed not to be taken seriously. These findings commensurate with sentiments by Foster and Gilbert (2001) who have stated that teachers are frequently unaware of visual problems since they mistake them for other similar ailments. When the teachers were asked to give their opinions why they found it difficult or moderately difficult to identify vision problems, they cited lack of knowledge and skills about visual problems as the major reason. The findings showed that the teachers lacked awareness about vision problems and hence the need for teacher sensitization.

A study which yielded similar results was done in Nepal and involved 76 subjects. It investigated visual problems the teachers could identify among schoolchildren. The study established that the teachers could easily identify visual problems like eye strain, eye fatigue, burning sensations irritations, redness, blurred vision, dry eyes and headaches. The study however differed

in that the teachers experienced no difficulty in identifying the visual problems (Dev, 2011).

In another comparable study conducted by Steve and Cathrine (2005) involving 109 children in Ugandan local primary schools, about a quarter of the children (27%) had vision problems. Some teachers reported that some of the participating children had been identified at an early stage especially those with easily recognized conditions such as albinism. Nonetheless, many of the children with visual problems were identified after starting school when their visual deficits became obvious to the class teacher in the course of early reading and writing tasks.

4.4 Vision Problems Exhibited by Children

This study sought to find out the visual problems that were exhibited by the school children using vision problem identification checklist. The vision problems addressed by the vision problem identification checklist included holding book close when reading, omission of letters and words when reading, frequent blinking of eyes, following line with finger when reading, unwillingness to engage in reading tasks, tendency to move near or away from light, difficulty in reading from the chalkboard, screwing up face or frown when trying to see, moving the head when reading instead of the eyes,

complaining of blurred or double vision and complaining of eye strain or headache when reading.

The vision problem identification checklists for individual learners were rated according to the frequency of occurrence of the various visual problems as either ‘never’, ‘sometimes’ or ‘often’. For the purposes of this study, only the vision problems that occurred ‘often’ (indicated persistence) were considered to be of utmost significance in indicating the presence of a vision problem. The following section shows the frequency of occurrence of the various vision problems among the study participants.

4.4.1 Children Stumbling on Objects When Walking

Table 4.3 represent the number of children who stumbled ‘often’ when walking. The study findings showed that this characteristic was exhibited by 6% of the respondents which indicated low prevalence. The prevalence of the vision problem within the schools included Kisiwa (25%), Kariguini (10%), Jamhuri, (5%), Mukerenju (5%), Kaminji, 1(5%) and Juja Farm, 1 (5%). Since this study investigated children in classes two and three (an age with increased activity/ play), there was a high possibility of teachers confusing ‘stumbling’ as an indicator of vision problem with stumbling which normally occurs during play activities. This could have inflated the figures and thus, influencing the study results.

Table 4.3: ***Children Stumbling on Objects when Walking***

School		Children Stumble walking N=240		
		Never	Sometimes	Often
Riandira	Count	16	4	0
	%	80	20	0
Kisiwa	Count	10	5	5
	%	50	25	25
Jamhuri	Count	15	3	2
	%	75	15	10
Heshima	Count	17	3	0
	%	85	14	0
Rukanga	Count	15	5	0
	%	75	25	0
Kaminji	Count	13	6	1
	%	65	30	5
Makutano	Count	16	4	0
	%	80	20	0
Mukerenju	Count	15	3	2
	%	75	15	10
Kiunyu	Count	8	10	2
	%	40	50	10
Kariguini	Count	19	0	1
	%	95	0	5
Kimorori	Count	11	9	0
	%	55	45	0
Juja_Farm	Count	14	5	1
	%	68	26	5
TOTAL	Count	169	57	14
	%	70	24	6

4.4.2 Children Holding Book Close when Reading

Table 4.4 shows the number of respondents who ‘often’ read the book closely. The findings illustrate that about 30% of the respondents showed this characteristic. Juja Farm Primary School had the highest number of children with this visual problem (65%) followed by Kariguini (40%), Riandira (35%), Kisiwa (30%) and Heshima (25%). In line with findings, Swamson (2006) has

noted that holding book closely when reading is a commonly observed visual characteristic in children.

Table 4.4: ***School Children Holding Book Close When Reading***

School	**Children Close Reading N= 240**		
	Never	Sometimes	Often
Riandira	5 (25%)	8 (40%)	7 (35%)
Kisiwa	11(55%)	3(15%)	6(30%)
Jamhuri	9(45%)	7(35%)	4(20%)
Heshima	10(50%)	5(25%)	5(25%)
Rukanga	5(25%)	10(50%)	5(25%)
Kaminji	5(25%)	13(65%)	2(10%)
Makutano	5(25%)	5(25%)	10(50%)
Mukerenju	8(40%)	8(40%)	4(20%)
Kiunyu	3(15%)	12(60%)	5(25%)
Kariguini	1(5%)	11(55%)	8(40%)
Kimorori	7(35%)	11(55%)	2(10%)
Juja_Farm	3(15%)	4(20%)	13(65%)
Total	73(30%)	96(40%)	71(30%)

Figure 4.1 shows that the number of children who ‘often’ read books closely was slightly higher in urban schools (34%) compared to those in rural schools.

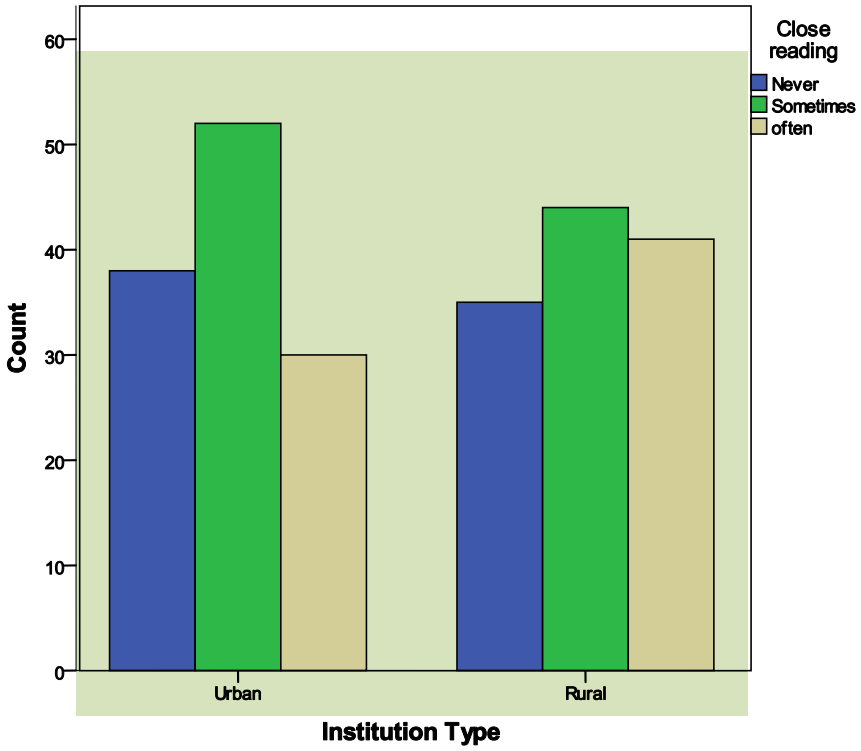


Figure 4.1: **Close Reading in Urban and Rural Schools**

4.4.3 Children with Omission of Letters and Words

Table 4.5 shows the children who 'often' had omission of letters and words when reading. Kisiwa had 40%, Makutano 30%, Mukerenju 45%, Kariguini 30% and Juja Farm 45%. Among all the participants, 24% 'often' had omission of letters and words when reading. Eden (2001) has noted that children who omit letters and words when reading are at high risk of developing visual impairments (Thomson, 2005).

Table 4.5: ***Omission of Letters and Words When Reading***

School		Letter/ Word Omissions N=240		
		Never	Sometimes	Often
Riandira	Count	6	10	4
	%	30	50	20
Kisiwa	Count	4	8	8
	%	20	40	40
Jamhuri	Count	9	8	3
	%	45	40	15
Heshima	Count	9	8	3
	%	43	38	15
Rukanga	Count	11	6	3
	%	55	30	15
Kaminji	Count	6	12	2
	%	30	60	10
Makutano	Count	6	8	6
	%	30	40	30
Mukerenju	Count	4	7	9
	%	20	35	45
Kiunyu	Count	0	15	5
	%	0	75	25
Kariguini	Count	1	13	6
	%	5	65	30
Kimorori	Count	5	14	1
	%	25	70	5
Juja_Farm	Count	5	6	9
	%	25	30	45
TOTAL	Count	66	115	59
	%	28	48	24

Deducing from Figure 4.2, there was no major difference in the prevalence of children who persistently omitted letters and words when reading in rural and urban schools (37 out of 120 children in rural schools and 22 out of 120 children in urban schools).

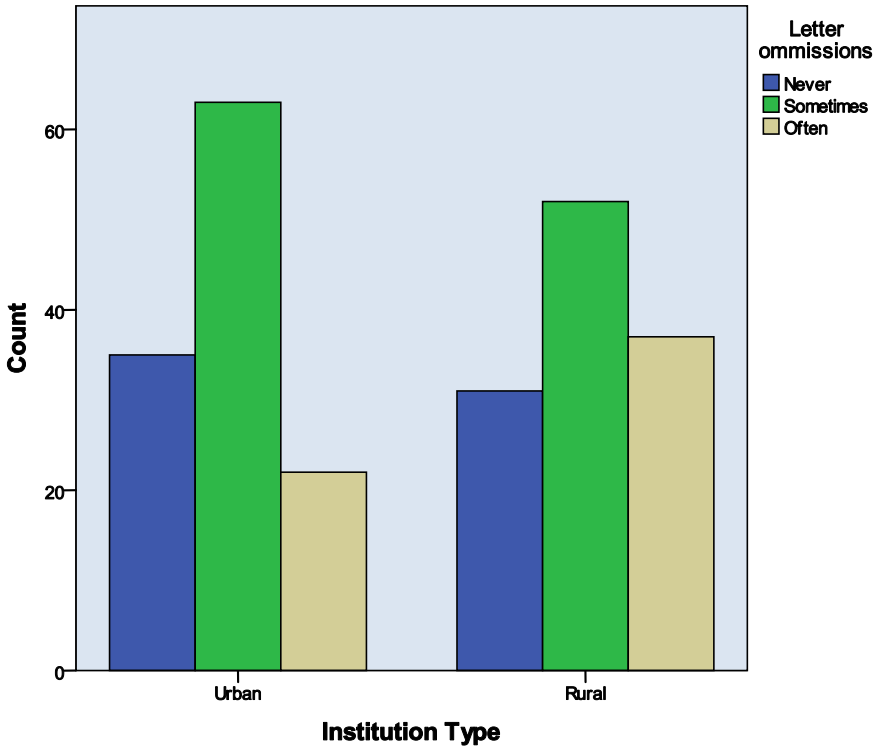


Figure 4.2: **Letter and Word Omissions When Reading**

4.4.4 Frequent Blinking of Eyes in Children

Eden (2001) has pointed out that children with visual problems tire easily and blink eyes during or after short periods of visual activity. Table 4.6 shows the number of children who 'often' had frequent blinking of eyes.

Table 4.6: ***Frequent Blinking of Eyes in School Children***

School		Eye Blinking N= 240		
		Never	Sometimes	Often
Riandira	Count	11	6	3
	%	55	30	15
Kisiwa	Count	5	10	5
	%	25	50	25
Jamhuri	Count	11	5	4
	%	55	25	20
Heshima	Count	11	5	4
	%	55	25	20
Rukanga	Count	9	7	4
	%	45	35	20
Kaminji	Count	8	9	3
	%	40	45	15
Makutano	Count	7	5	8
	%	35	25	40
Mukerenju	Count	9	5	6
	%	45	25	30
Kiunyu	Count	2	10	8
	%	10	50	40
Kariguini	Count	8	6	6
	%	40	30	30
Kimorori	Count	7	11	2
	%	35	55	10
Juja_Farm	Count	4	8	8
	%	20	40	40
TOTAL	Count	92	87	61
	%	38	36	26

Table 4.6 shows that over a quarter (26%) of the respondents ‘often’ exhibited frequent blinking of eyes which indicated a fairly common vision problem.

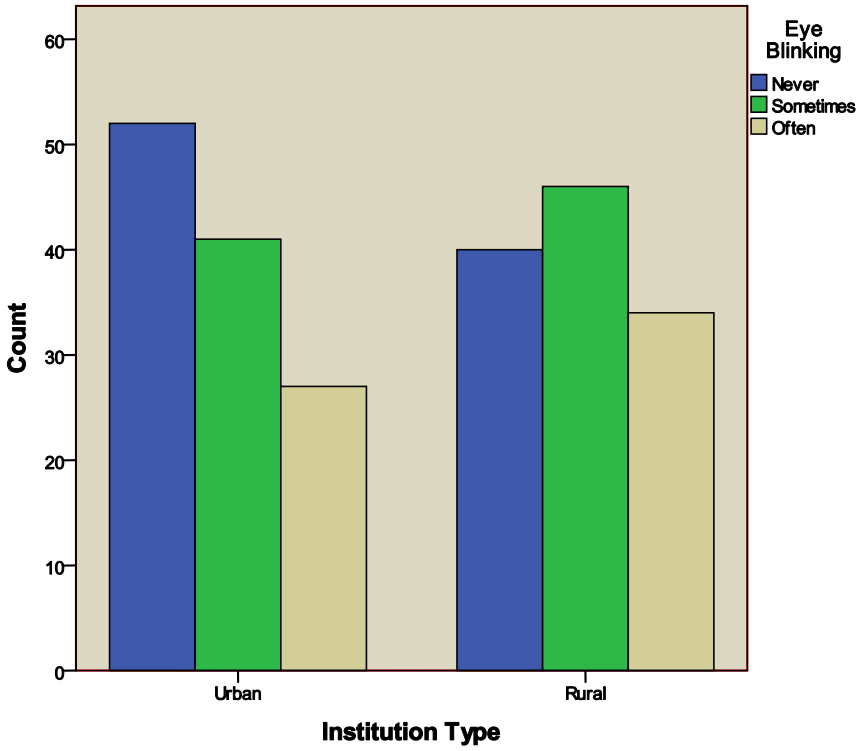


Figure 4.3: **Frequent Blinking of Eyes**

Deducing from Figure 4.3, the number of children who 'often' had frequent blinking of eyes were slightly more prevalent in the rural schools (28%) than in urban schools (23%).

4.4.5 Children Following Line with Finger When Reading

Table 4.7 shows the number of children who 'often' followed line with finger when reading.

Table 4.7: ***Children Following Line with Finger when Reading***

School		**Finger reading N= 240**		
		Never	Sometimes	Often
Riandira	Count	4	9	7
	%	20	45	35
Kisiwa	Count	4	8	8
	%	20	40	40
Jamhuri	Count	9	7	4
	%	45	35	20
Heshima	Count	12	3	5
	%	60	15	25
Rukanga	Count	5	12	3
	%	25	60	15
Kaminji	Count	5	10	5
	%	25	50	25
Makutano	Count	4	6	10
	%	20	30	50
Mukerenju	Count	8	8	4
	%	40	40	20
Kiunyu	Count	2	11	7
	%	10	55	35
Kariguini	Count	3	10	7
	%	15	50	35
Kimorori	Count	0	5	15
	%	0	25	75
Juja_Farm	Count	1	8	11
	%	5	40	55
TOTAL	Count	57	97	86
	%	24	40	36

As summarized in Table 4.7, the number of children who ‘often’ followed line with finger when reading were 11(55%) in Juja Farm, 15(75%) in Kimorori, 7(35%) in Kiunyu, 7(35%) in Kariguini, 8(40%) in Kisiwa and 7(35%) in Riandira. According to Cotter (2006), a child often follows line with finger when reading in an attempt to minimise the effects of the visual problems. It is a compensation usually applied by children to prevent the loss of place associated with a break in fixation. Tracking is the ability to move the eyes across a sheet of paper and enables a person to control the fine eye movements required to trace a line of point, which is especially important in reading (Thomson, 2005). Children with tracking problems will often lose their place, skip words and have difficulty comprehending because of the difficulty moving their eyes accurately. Many are forced to move their fingers to trace the line because their eyes cannot.

Figure 4.4 shows the number of children who followed line with fingers in urban and rural schools. The number of children who often followed line with finger when reading comprised 39% in urban schools and 32% in rural schools, indicating slightly higher occurence in urban schools.

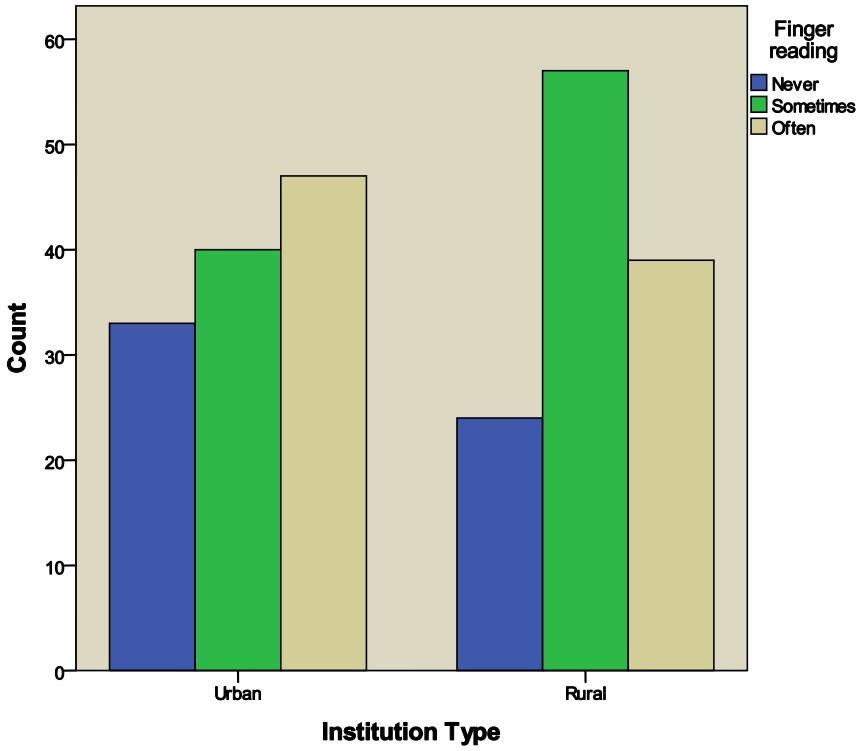


Figure 4.4: **Children Following Line with Finger When Reading**

4.4.6 Children Unwillingness to Engage in Reading Tasks

From Table 4.8, the number of children who were 'often' unwilling to engage in reading tasks was Juja Farm 8(40%), Kimorori 15(75%), Kariguini 9(45%), Mukerenju 8(40%), Makutano 6(30%), Heshima 6(30%), Jamhuri 7(35%) and Kisiwa 12(60%). In this study a large number of children (89 out of the 240) were 'often' unwilling to engage in reading tasks. According to Limburg (1995) children who have visual problems would rather associate in other activities like talking to the neighbour or looking out the window than have to concentrate on the difficult visual task of reading.

Table 4.8: ***Children Unwillingness to Engage in Reading Tasks***

School		Reading unwillingness N=240		
		Never	Sometimes	Often
Riandira	Count	6	10	4
	%	30	50	20
Kisiwa	Count	0	8	12
	%	0	40	60
Jamhuri	Count	2	11	7
	%	10	55	35
Heshima	Count	5	9	6
	%	25	45	30
Rukanga	Count	6	12	2
	%	30	60	10
Kaminji	Count	7	10	3
	%	35	50	15
Makutano	Count	11	3	6
	%	55	15	30
Mukerenju	Count	6	6	8
	%	30	30	40
Kiunyu	Count	0	11	9
	%	0	55	45
Kariguini	Count	4	7	9
	%	20	35	45
Kimorori	Count	0	5	15
	%	0	25	75
Juja_Farm	Count	5	7	8
	%	25	35	40
TOTAL	Count	52	99	89
	%	22	41	37

Figure 4.5 indicates that among the children in urban schools, 47(40%) and 42(35%) in rural schools were ‘often’ unwilling to engage in reading tasks. This finding shows a high prevalence of the vision problem.

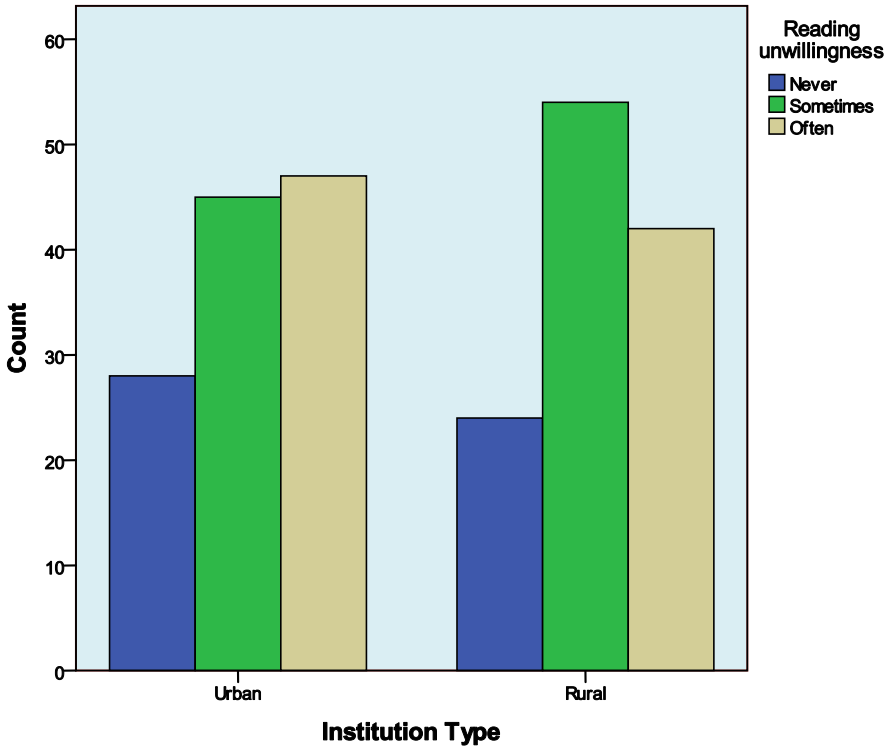


Figure 4.5: **Children Unwilling to Engage in Reading Tasks**

4.4.7 Children's Tendency to Move Near or Away From light

Moving near or away from light is characteristic of children with low vision who can greatly benefit from simple classroom adaptations. Table 4.9 indicate that the number of children who 'often' moved near or away from light was Kisiwa (60%), Makutano (40%), Kariguini (35%), Kimorori (30%) and Juja Farm (40%). These findings indicate a high occurrence of the vision problem (1 child in every 4).

Table 4.9: ***Children's Tendency to Move Near or Away From Light***

School		Moving near/far from light N=240		
		Never	Sometimes	Often
Riandira	Count	6	9	5
	%	30	45	25
Kisiwa	Count	2	6	12
	%	10	30	60
Jamhuri	Count	10	8	2
	%	50	40	10
Heshima	Count	14	6	0
	%	70	30	0
Rukanga	Count	5	13	2
	%	25	65	10
Kaminji	Count	12	6	2
	%	60	30	10
Makutano	Count	7	5	8
	%	35	25	40
Mukerenju	Count	10	7	3
	%	50	35	15
Kiunyu	Count	4	11	5
	%	20	55	25
Kariguini	Count	8	5	7
	%	40	25	35
Kimorori	Count	4	10	6
	%	20	50	30
Juja_Farm	Count	4	8	8
	%	20	40	40
TOTAL	Count	86	94	60
	%	36	39	25

Figure 4.6 confirms that in the urban schools, 26(22%) children and 34(28%) children in rural schools 'often' moved away or away from light.

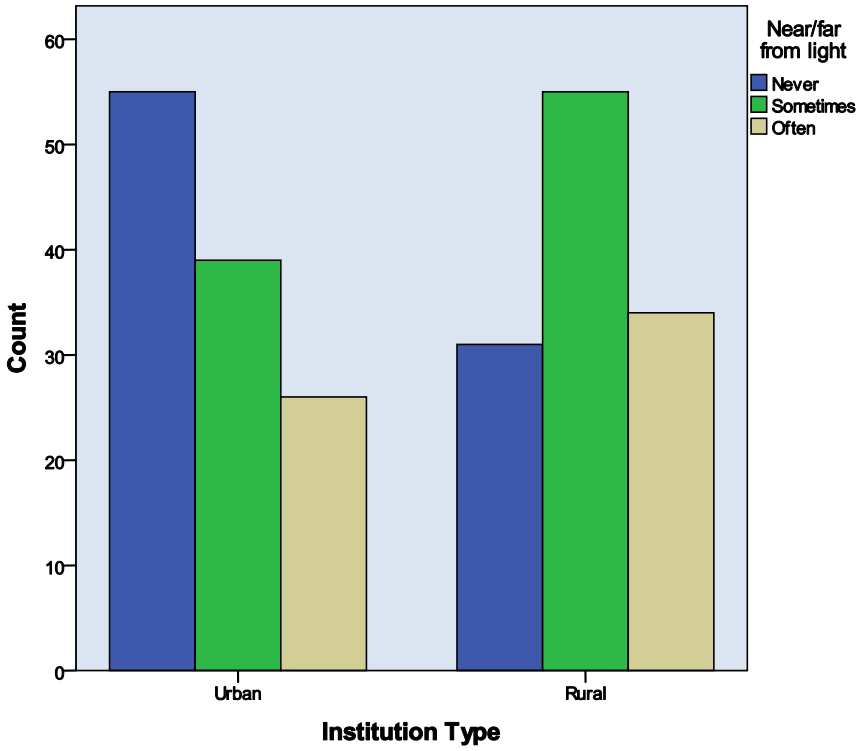


Figure 4.6: **Children's Tendency to Move near or Away From Light**

4.4.8 Children Experiencing Difficulty Reading From chalkboard

Inferring from Table 4.10, the children who experienced difficulty in reading from the chalkboard were 10(50%) in Kisiwa, 6(30%) in Makutano, Riandira 6(30%), Mukerenju 11(55%), Kariguini 9(45%) and Juja Farm 12(60%). One child in every 4 (79 out of 240) experienced difficulty in reading from the chalkboard.

Table 4.10: D*ifficulty Reading from Chalkboard*

School		Difficult reading		N= 240
		Never	Sometimes	Often
Riandira	Count	5	9	6
	%	25	45	30
Kisiwa	Count	2	8	10
	%	10	40	50
Jamhuri	Count	7	9	4
	%	35	45	20
Heshima	Count	9	6	5
	%	45	30	25
Rukanga	Count	7	8	5
	%	35	40	25
Kaminji	Count	7	10	3
	%	35	50	15
Makutano	Count	8	6	6
	%	40	30	30
Mukerenju	Count	2	7	11
	%	10	35	55
Kiunyu	Count	0	16	4
	%	0	80	20
Kariguini	Count	6	5	9
	%	30	25	45
Kimorori	Count	1	15	4
	%	5	75	20
Juja_Farm	Count	1	7	12
	%	5	35	60
TOTAL	Count	55	106	79
	%	23	44	33

Figure 4.7 shows children who ‘often’ had difficulty reading from the chalkboard.

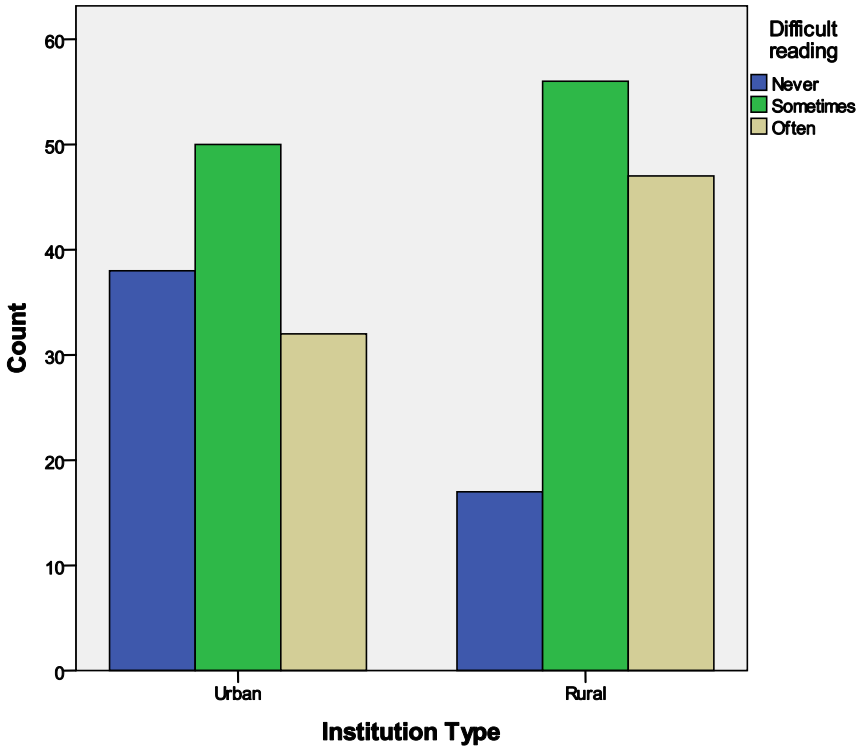


Figure 4.7: **Children having difficulty reading from chalkboard**

Figure 4.7 show that 32 children (27%) from urban schools and 47(39%) from the rural schools had difficulty reading from the chalkboard. The National commission on vision and health (2012) posits that difficulty reading from the chalkboard may lead to problems in school, and if uncorrected may negatively affect children's perceptions about their abilities to learn.

4.4.9 Children Screwing up Face/Frown when trying to see

Frequent screwing of the face or frowning when trying to see is an indication that the eyes are being strained (Thomson, 2005). When noted, there is need for further investigations to determine the cause and the next cause of action.

Table 4.11 illustrates the number of children who 'often' screwed up their faces or frowned when trying to see.

Table 4.11: ***Children Screwing up Face or Frowning When Trying to See***

School		**Frowning N= 240**		
		Never	Sometimes	Often
Riandira	Count	15	1	4
	%	75	5	20
Kisiwa	Count	4	11	5
	%	20	55	25
Jamhuri	Count	13	6	1
	%	65	30	5
Heshima	Count	12	5	3
	%	60	25	15
Rukanga	Count	9	8	3
	%	45	40	15
Kaminji	Count	9	9	2
	%	45	45	10
Makutano	Count	9	7	4
	%	45	35	20
Mukerenju	Count	11	7	2
	%	55	35	10
Kiunyu	Count	2	14	4
	%	10	70	20
Kariguini	Count	4	5	11
	%	20	25	55
Kimorori	Count	8	8	4
	%	40	40	20
Juja_Farm	Count	6	9	5
	%	30	45	25
TOTAL	Count	102	90	48
	%	42	38	20

Table 4.11 shows that different schools had different number of children who 'often' screwed up the face or frowned when trying to see like Kariguini, 11(55%), Juja Farm and Kisiwa, 5(25%), Heshima, 3(15%) and Makutano, 4(20%). Twenty percent of all the respondents 'often' screwed face or frowned when trying to see.

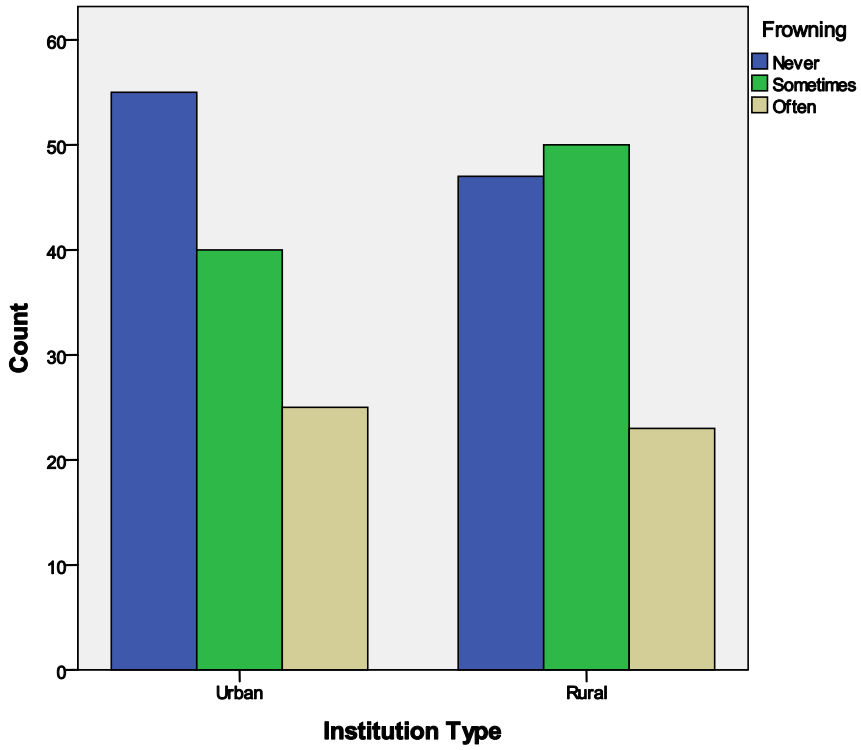


Figure 4.8: **Children screwing face or frowning when trying to see**

Figure 4.8 shows that children who had this visual problem were 25(21%) in urban schools and 23(19%) in rural schools. The total number of children screwing the face when seeing was 48 (20%), interpreting to 1 child in every 5 children.

4.4.10 Children Who Move Head Instead of Eyes When Reading

Table 18 shows the number of children who ‘often moved the heads instead of eyes when reading.

Table 4.12: ***Children Moving Head Instead of Eyes When Reading***

School		Moving head on reading N=240		
		Never	Sometimes	Often
Riandira	Count	14	5	1
	%	70	25	5
Kisiwa	Count	0	10	10
	%	0	50	50
Jamhuri	Count	10	7	3
	%	50	35	15
Heshima	Count	8	8	4
	%	40	40	20
Rukanga	Count	13	5	2
	%	65	25	10
Kaminji	Count	7	10	3
	%	35	50	15
Makutano	Count	11	4	5
	%	55	20	25
Mukerenju	Count	11	8	1
	%	55	40	5
Kiunyu	Count	3	13	4
	%	15	65	20
Kariguini	Count	5	4	11
	%	25	20	55
Kimorori	Count	5	10	5
	%	25	50	25
Juja_Farm	Count	11	2	7
	%	55	10	35
TOTAL	Count	98	86	56
	%	41	36	23

Table 4.12 specifies that moving head instead of eyes when reading was noted to occur ‘often’ in (50%) children in Kisiwa, (25%) in Makutano, (25%) in Kariguini, (55%) Kimorori and Makutano (25%) Juja Farm, (35%) and

Heshima, (20%). Figure 4.9 illustrate that the children who experienced the visual problem ‘often’ were 32(26%) in the urban schools and 24 (20%) in the rural schools totalling to 56(23%) out of 240 participants (1 child in every 4). According to Roberts (1992), a child who moves the head instead of the eyes when reading is possibly having a problem in teaming the two eyes or in focusing. Once identified, these visual problems could be corrected and necessary support be provided.

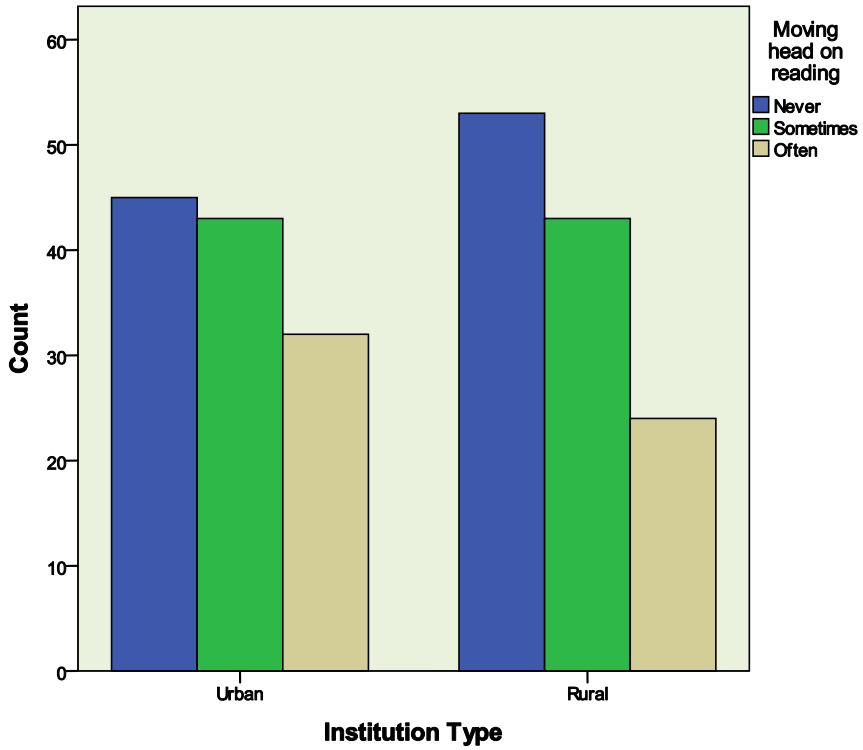


Figure 4.9: ***Children Moving Head Instead of Eyes When Reading***

4.4.11 Children Complaining of Blurred or Double Vision

Table 4.13 show the number of children who 'often' complained of blurred or double vision.

Table 4.13: ***Children Complaining of Blurred or Double Vision***

School	Children	Blurred/ Double vision N=240		
		Never	Sometimes	Often
Riandira	Count	15	5	0
	%	75	25	0
Kisiwa	Count	6	9	5
	%	30	45	25
Jamhuri	Count	9	7	4
	%	45	35	20
Heshima	Count	12	7	1
	%	60	35	5
Rukanga	Count	9	7	4
	%	45	35	20
Kaminji	Count	11	4	5
	%	55	20	25
Makutano	Count	11	4	5
	%	55	20	25
Mukerenju	Count	13	5	2
	%	65	25	10
Kiunyu	Count	12	7	1
	%	60	35	5
Kariguini	Count	11	5	4
	%	55	25	20
Kimorori	Count	16	3	1
	%	80	15	5
Juja_Farm	Count	10	5	5
	%	50	25	25
TOTAL	Count	133	68	39
	%	56	28	16

Table 4.13 show that children who ‘often’ complained of blurred or double vision consisted 4(20%) from Jamhuri, 4(20%) from Rukanga, 5(25%) from Kaminji, 5(25%) from Makutano, 4(20%) from Kariguini and 5(25%) from Juja Farm. As mentioned by Eberechukwu (2012), when the eyes align and focus normally, the print on the page is single and clear. Reading requires the eyes to aim at the same point on the page. Moreover, children with eye teaming problems find it difficult to maintain focus for near work. As the eyes tire, they focus at different points on the page, giving rise to blurred or double print.

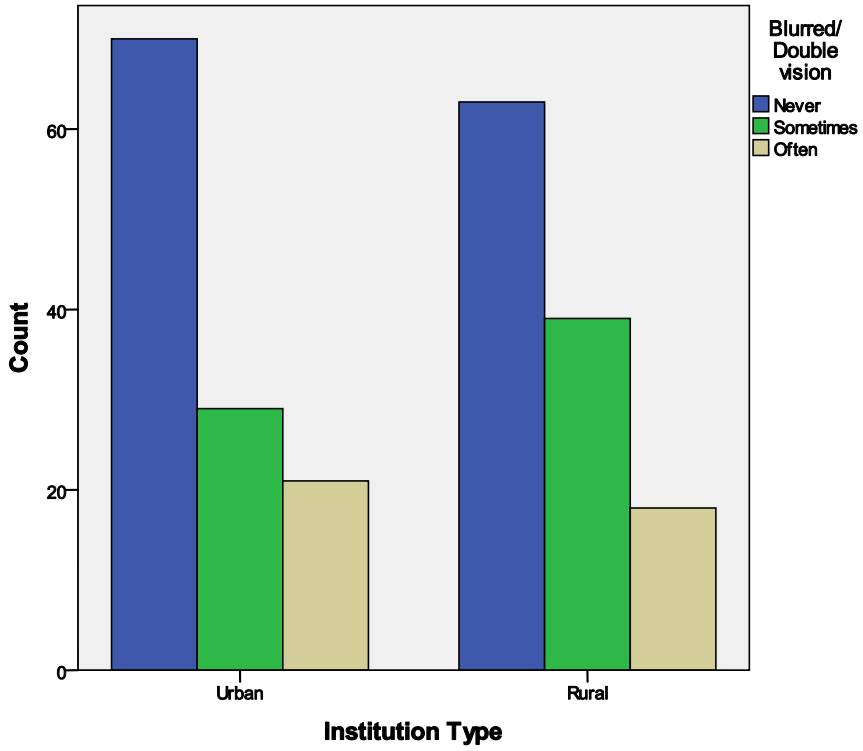


Figure 4.10: **Children Complaining of Blurred or Double Vision**

Figure 4.10 illustrate that children who complained of blurred or double vision 'often' accounted for 21 children (18%) in urban schools and 18(14%) in rural schools totalling to 39 (16%) of all the respondents or 1 child in every 6 children.

4.4.12 Children Complaining of Eye Strain or Headaches When reading

Table 4.14 shows that children who 'often' complained of eye strain and headaches when reading.

Table 4.14: ***Children Complaining of Eye Strain/ Headaches***

School		Eye strain or Headache N=240		
		Never	Sometimes	Often
Riandira	Count	14	4	2
	%	70	20	10
Kisiwa	Count	1	15	4
	%	5	75	20
Jamhuri	Count	12	4	4
	%	60	20	20
Heshima	Count	8	3	9
	%	40	15	45
Rukanga	Count	8	9	3
	%	40	45	15
Kaminji	Count	10	5	5
	%	50	25	25
Makutano	Count	7	8	5
	%	35	40	25
Mukerenju	Count	12	7	1
	%	60	35	5
Kiunyu	Count	10	9	1
	%	50	45	5
Kariguini	Count	9	6	5
	%	45	30	25
Kimorori	Count	10	8	2
	%	50	40	10
Juja_Farm	Count	7	8	5
	%	35	40	25
TOTAL	Count	109	85	46
	%	46	36	18

Table 4.14 shows that children who ‘often’ complained of eye strain and headaches when reading were Heshima, 9(45%) Kaminji, 5(25%) Makutano, 5(25%) Kariguini, 5(25%) and Juja Farm 5(25%).

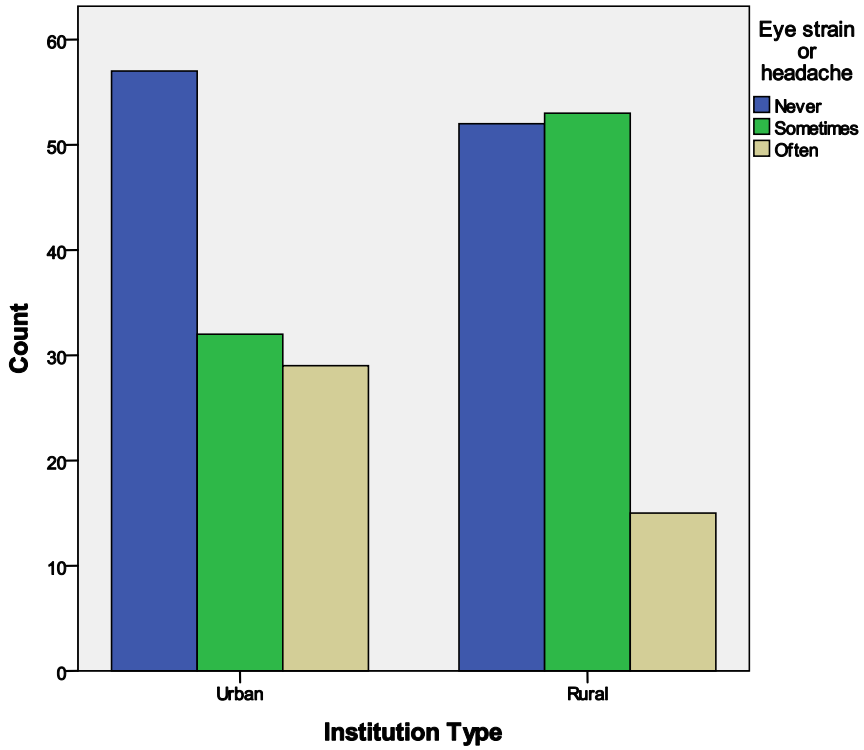


Figure 4.11: **Children Complaining of Eye Strain and Headaches**

Figure 4.11 indicate that the respondents who ‘often’ experienced eye strains or headaches when reading in the urban schools were slightly higher 29(25%) than those in the rural primary schools 17 (13%). The sum of children who had this visual problem was 1 child in every 5. Complaining of headaches or eye strains could be very exhausting especially because in school, children

learn a lot visually by what they see. With the presence of headaches and eye strains, children struggle to see and hence, lose concentration and interest in learning (Thomson, 2005).

The foregoing sub- sections analyzed findings for twelve common clues of vision problems that were exhibited by children in public primary schools. The study has shown that school children in public primary school have undiagnosed vision problems which range from 6-37% in prevalence. These findings were comparable to other similar studies like a study conducted by Adegbehingbe (2005) which noted that undiagnosed vision problems in public schools accounted for 13.5%, PAVE (1996) indicated 25% which were similar to other findings by Prevent Blindness America (2000) and WHO (2009). These findings affirm the need for early identification of children with visual problems. Cooper (1996) asserts that early identification of visual problems in school children is core to preventing, controlling and correcting them.

4.5 Extent of Visual Loss in children

The current study utilized the Snellen chart to establish the children's visual acuity. In this study, if a child had a visual acuity measurement of 6/12 or worse in either one or both eyes, it was considered a significant visual loss worth further assessments and interventions. This was in line with sentiments

by Hartman (2001) who has stipulated that failure for the visual acuity test for either one or both eyes is 6/12 (20/40) or worse for children six years of age or older. Equally, Taylor and Keeffe (2001) states that any visual acuity of 6/12 or below (Binocular acuity: vision using both eyes and monocular acuity: vision using one eye) affected visually intensive tasks as well as one's ability to function in everyday life. Table 4.15 shows right and left eye visual acuities of the respondents:

Table 4.15: ***Right and Left Eye Visual Acuity***

Right Eye Visual Acuity	Left Eye Visual Acuity	N=240
6/6	6/6	97(40%)
6/6	6/9	36(15%)
6/6	6/18	1(.4%)
6/9	6/6	32(13%)
6/9	6/9	54(23%)
6/9	6/12	2(.8%)
6/9	6/18	3(1.3%)
6/12	6/9	2(.8%)
6/12	6/12	2(.8%)
6/12	6/18	2(.8%)
6/18	6/9	1(.4%)
6/18	6/12	1(.4%)
6/18	6/18	4(.6%)
6/18	6/60	1(.4%)
6/60	6/9	1(.4%)
6/60	6/18	1(.4%)

Table 4.15 shows the right and left eye visual acuity for all the participants of the study. The data shows that majority of the participants had visual acuity of 6/6 and 6/9 in either one or both eyes which indicated that their visual loss was not significant. However, some respondents had significant visual loss (Visual acuity of 6/12 or worse in one or both eyes) as shown in Table 4.16.

Table 4.16: ***Visual Acuity of 6/12 or Worse in One or Both Eyes***

Right Eye Visual Acuity	Left Eye Visual Acuity	Count (%)
6/6	6/18	1(.4%)
6/9	6/12	2(.8%)
6/9	6/18	3(1.3%)
6/12	6/9	2(.8%)
6/12	6/12	2(.8%)
6/12	6/18	2(.8%)
6/18	6/9	1(.4%)
6/18	6/12	1(.4%)
6/18	6/18	4(1.6%)
6/18	6/60	1(.4%)
6/60	6/9	1(.4%)
6/60	6/18	1(.4%)
TOTAL	_	21(8.75%)

Data presented in Table 4.16 show the number of children who had visual acuity of 6/12 or worse in one or both eyes accounted for 21 out of 240 respondents (8.75%). According to the National Commission on Health and

Vision (2012), when visual loss remain undiagnosed, most frequently it goes uncorrected until children present with problems in school achievement or develop severe visual problems.

The results of the current study were comparable with those of Mohammed (2009) on the prevalence of refractive errors involving 5913 primary school children from different socio-economic strata and schools. Among all participants of that study, 551 children (9.32%) had visual acuity of 6/12 (20/40) or worse in at least one eye. Similarly, an Iranian study of 215 respondents found that 18 (8.4%) recorded a visual acuity of 6/12 or worse in at least one eye (National Commission on Vision and health, 2012). Other studies found out the prevalence as 4.82% (Solange & Fabio, 2008) and 11.6% (Medi and Mayaku).

During the study, it was discovered that no school visual screening services were being offered in all the public primary schools in the counties under study. This in turn revealed that children with possible visual losses mostly remained unidentified. This study was therefore was an eye opener in exposing the dire need for visual screenings in the schools. Another important discovery was that 3 children had a visual acuity of 6/60 which indicated severe visual loss. Unfortunately, no special education services or interventions had been provided to cater for the individual needs of these

children. As stated by Groffman (2006), severe visual loss impacts on learning especially because most learning activities involve visual tasks.

Another interesting finding was that one of the respondents who had severe visual loss of 6/60 in the right eye realised for the first time that he could not see at all with the affected eye and that he was only using one eye for all visual tasks. With further probing, it was noted that the respondent had been complaining of recurrent headaches and eye strain for a long time although no-one had ever suspected visual loss. This finding necessitated referral for further intensive investigations. In support of this finding, Crissy (2009) comments that children rarely realise when they have a visual problem because they think everybody else sees the way they do.

In the current study, all children who had a visual acuity of 6/12 or worse (monocular or binocular) were advised through their teachers to seek further intensive assessments from eye care professionals or assessment centres so as to determine the most effective intervention services.

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4.6 How Teachers Supported Children with Visual Problems

Item number 8 in the class teachers and head teachers interview schedules sought to elicit data on how the teachers supported children with visual problems. The findings are highlighted in Table 4.17.

Table 4.17: ***Support Offered by Teachers to Children with Visual Problems***

Support offered by teachers	Teachers in rural schools(N=12)	Teachers in urban schools(N=12)	Total (N=24)
Seek medical help	2	6	8(34%)
Referral to assessment centres	0	1	1(4%)
Washing eyes with salty water	5	1	6(25%)
Positioning near chalkboard	1	1	2(8%)
Writing using large letters	1	0	1(4%)
Avoiding dusty places	2	1	3(13%)
Avoiding bright light	0	1	1(4%)
General cleanliness	1	1	2(8%)

Deducing from Table 4.17, half of the teachers in the urban schools 6 (50%) advised children with eye/ visual conditions to seek medical help. In the case of rural schools, majority of the teachers 5 (42%) tended to advise the school children to wash the eyes using salty water. With further probing, the researcher confirmed that the teachers held strong beliefs that salt solution was effective in clearing most visual conditions like red or discharging eyes, a

claim which is researchable. Only one teacher in the urban school had taken the initiative of referring the children for further assessment and evaluation in the assessment centres. It was noted that the other teachers seemed not to be aware of the role of assessment centres in addressing any visual conditions the children exhibited.

Gauging from the findings, the kind of support the teachers offered to children with visual problems was trial and error, as long as it worked somehow. This was probably due to the teachers' minimal understanding and lack of awareness about the proper special education supports for children with visual problems. As opposed to this kind of trial and error support methods, Basu (1991) recommends provision of appropriate services and accommodations, use of specialized materials, equipment and technology to support children with visual problems.

During the study, one encouraging form of support was noted in one of the urban schools where the head teacher had organised financial sponsorship for a child who was to undergo an eye surgery. In another urban school, the teachers had contributed towards specialized visual checkups for a needy child whose eye sight had been noted to be progressively deteriorating.

4.7 Teachers' Constraints in Identifying Children with Vision Problems

Item number 7 in the teachers' interview schedules sought to find out the teachers' constraints in identifying children with visual problems. Table 4.18 gives a summary of the constraints mentioned by the teachers in both the rural and urban schools.

Table 4.18: ***Teachers' Constraints in Identifying Children with Visual Problems***

Constraints	Rural schools		Urban schools		TOTAL	
	No	%	No	%	No	%
Minimal knowledge and skills about visual problems	5	42	4	33	9	38
Lack of personnel/ facilities to conduct visual checkups	4	33	2	17	6	25
Children conceal visual problems	2	17	3	25	5	21
Lack of individualized attention due to large classes	1	8	3	25	4	16
TOTAL	12	100	12	100	24	100

The major constraint in identifying children with visual problems was lack of knowledge and skills about visual problems (38%). This was attributed to lack of training in the area of visual impairments. The lack of skills and knowledge could partly be explained by some finding by KIE (2010), which has cited that continuous capacity development of teachers in public schools is either haphazard or lacking and in-service training of teachers is hampered by inadequate time and

prohibitive costs of training. The respondents also cited lack of school visual screening services. This study revealed that in all the participating schools, school visual screening had never been witnessed. These findings correspond to opinions by Smeeth (2000) that there are high numbers of children with unidentified visual problems in schools because visual screening is never done on them.

In this current study, the teachers expressed appreciation of the visual screenings and hoped that the relevant actions should be taken by stakeholders in education in ensuring that there was regular school visual screening programs to be performed to all school children. This would go a long way in early identification of children with visual problems for timely interventions.

4.8 Teachers' Constraints in Supporting Children with Vision Problems

Item number 9 in the interview schedules asked head teachers and the class teachers to give the constraints they encountered in supporting children with visual problems. Table 4.19 and Table 4.20 summarises the constraints teachers encountered in supporting children in the rural and urban schools respectively.

Table 4.19: ***Constraints in Supporting Children in Rural Schools***

Constraints	No. of C/ teachers (%)
Lack knowhow on the appropriate support required	3(25%)
Parents not reporting visual problems to teachers	2(17%)
Religion barriers- parents do not seek medical help	1(1%)
Parents lack finances for skilled visual check- ups	2(17%)
Illiterate and ignorant parents	1(8%)
Parents ignore teachers advise	3(25%)
TOTAL	12(100%)

From Table 4.19, 3(25%) teachers reported lack of knowhow on the appropriate support that was needed to address the various visual problems. Two (17%) teachers mentioned that parents never reported visual problems exhibited by their children, thus this acted as a constraint in offering any kind of support. One (8%) teacher complained of some parents who belonged to some religious sects that prohibited children with visual problems from seeking medical or any other assistance. Two 2(17%) teachers argued that for some poor parents, visual checkups remained a luxury and not a priority, thus, children from such families never undertook the visual checkups even when recommended. One teacher complained that some illiterate parents never heeded to advice offered. Three (25%) teachers had given up offering support altogether because according to them, it was a waste of time to keep advising

parents on what to do and yet they never heeded. From the foregoing findings, most of the constraints highlighted pointed on parent's failures hence, the need for more cooperation between parents and the teachers to promote the support of children with visual problems.

Table 4.20: ***Teachers' Constraints in Supporting Children in Urban Schools***

Challenges Encountered	No of Class teachers
Teachers lack knowhow on the appropriate support needed	2(17%)
Parents not revealing visual problems to teachers	2(17%)
Working parents- little time to notice visual problems	1(8%)
Parents accuse teachers of labelling children	2(17%)
Parents do not heed to advice offered	3(25%)
TOTAL	12(100%)

Table 4.20 indicate constraints in supporting teachers in urban schools which are similar to those in rural schools. However, 2(17%) teachers complained that they feared offering any kind of support since the parents accused them of labelling their children as 'disabled'. One (8%) teacher commented that working parents had little contact time with their children and hardly noticed any visual problems. Hence, children with visual problems remained unreported and unsupported.

Deducing from the general comments made by the teachers in both rural and urban schools concerning supporting children with visual problems, once a child was noted with a visual problem, it was the duty of the parents to provide the support needed since the schools lacked funds to follow up the cases. This standpoint discloses the necessity for the teachers to be sensitized of simple classroom and environmental modifications that can be applied to support children with some types of visual problems rather than relying on the support from the parents (Lueck, 1999).

4.9 Teacher's Views on promoting Early Identification of Children with Vision Problems

Questions 8 and 9 (in the head teachers and class teachers' interview schedules respectively) asked the teachers to give suggestions on how identification of visual problems in children could be enhanced. Table 4.21 summarises the teacher's suggestions.

Table 4.21: ***Teacher's Views on Promoting Early Identification of Children with Visual Problems***

Teachers views	No. of Class teachers	No. of Head teachers
Frequent visual screening exercises	14(58%)	9(75%)
Special education seminars and workshops	7(29%)	2(17%)
Provision of relevant equipments and facilities in assessment centres	3(13%)	1(8%)
TOTAL	24(100%)	12(100%)

What can be derived from 4.21 is that 14 (58%) class teachers and 9(75%) head teachers were in favour of frequent visual screening exercises for all schoolchildren. According to them, termly or annual visual screening exercises by skilled personnel would go a long way in identifying children with potential need for timely support. These opinions concurred with those of a study conducted in Sweden by Merc (2006) which concluded that visual screenings were effective in early identification of visual problems.

As described in Section 4.1, very few teachers in the study had done special education. This could explain why (29%) teachers and (17%) head teachers saw the need for special seminars and workshops to help them gain skills and knowledge about visual problems. Three (13%) teachers and (8%) head teacher suggested that existing assessment centres ought to have the right personnel and be fully equipped to be able to manage all children referred.

The foregoing suggestions by the teachers on enhancing early identification of children with visual problems could be beefed-up by opinions of Desmond (2012) in a study on learning related vision problems in school- age children in Nigeria. He made the following recommendations to enhance learning and reduce the prevalence of learning related vision problems among school children:

• Every child should have a routine eye examination to test both near and distant vision. However, vision screening should not be a substitute for a complete eye and vision assessment by an eye doctor (optometric physician/eye care provider).

• Comprehensive eye and vision examinations should be made mandatory for all children first entering school and, regularly throughout their school years to ensure healthy eyes and adequate visual skills essential for successful academic achievement.

• The importance of continuing eye care should be discussed with parents and caregivers. Parents and guardians should pay close attention to their children regarding the visual problems and their academic performance.

• Optometrists should involve themselves more actively in vision screening, and identifying and managing vision problems that may impair learning.

• Communication with education professionals about the diagnosis, proposed management plan and expected outcome should be initiated by eye specialists. This therefore, requires the coordinated efforts of the children, classroom teachers, special education teachers and therapists.

• Education professionals should be informed about the presence and nature of vision problems and their relationship to extant learning difficulties.

4.10 Summary

The preceding chapter has outlined the findings of the current study based on the objectives. The findings have indicated that a good number of children in Public Primary schools have visual problems; teachers face constraints in identifying and supporting children with visual problems and children with visual problems are inadequately identified and supported. The study has exposed some ways of promoting identification and support of children with visual problems. The subsequent chapter will focus on the Summary of the findings, conclusions and recommendations.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gives a summary of the findings of the various issues revealed in the foregoing chapter. It also draws conclusions and makes recommendations on how the study could be strengthened so as to improve policy and practice in identifying special needs in children. The chapter concludes with suggestions for future research.

5.2 Summary

The following section looks at a summary of the main findings derived from the study based on the objectives.

5.2.1 Teachers Demographic Characteristics

The first objective sought to establish demographic information of the head teachers and the class teachers (in classes two and three). The criterion of investigation was based on the number of teaching years and the special education qualifications of the respondents.

The number of years the respondents taught was categorized under: below 1 year, 1-2 years or above 2 years. This categorization was based on the argument that the longer the period of teaching; the more likely the teacher

would notice persistent vision problems exhibited by the children. The results showed that none of the head teachers had been in the school below one year and majority of the teachers had taught their classes for over one year. These findings indicated that the respondents had interacted with the children long enough to have noted any persistent vision problem in children.

The respondents were asked to mention whether they had done special needs education and to mention the area of specialization where applicable. The results of the study showed that none of the head teachers had specialized in the area of visual impairments. On the side of the class teachers, only one teacher had special needs education in the area of visual impairments. All the other class teachers had no specialization in special needs education.

The aforementioned findings revealed that the teachers lacked the necessary skills to effectively identify children with visual problems. This study exposed the need for special education training through seminars, workshops and in-service courses for teachers to equip them with the relevant knowledge and skills to successfully identify children with visual problems.

5.2.2 Teachers ability to identify Vision problems

To achieve the objective of finding out the ability of respondents to identify visual problems among the children, this study asked them to mention some of the vision problems they had observed. The teachers were also asked to rate their ability to identify vision problems as very difficult, moderately difficult or easy.

The current study found out that the teachers could mention some vision problems with ease although there before, they thought what the children exhibited were allergies or simple eye ailments which raised no alarm to them.. Some of the vision problems mentioned included tearing eyes, red eyes and close reading which the teachers said were easily observable. However, the teachers pointed out that it was difficult to observe some visual problems like painful eyes and double vision, unless reported by the affected children. These findings indicated lack of awareness about vision problems on the side of the teachers. This therefore calls for the need to equip teachers with relevant special education knowledge and skills through workshops, seminars and in- service courses. This could enhance their ability to identify children with vision problems for early interventions.

5.2.3 Vision Problems Exhibited by Children

This study sought to investigate the vision problems that were exhibited by the children in public primary schools. To adequately achieve this objective, the current study examined the frequency of occurrence of vision problems (never, sometimes or often) among the children. This study concentrated on the vision problems that occurred 'often' which indicated persistence of the problem. A total of twelve vision problems were investigated which included holding book close when reading, omission of letters and words when reading, frequent blinking of eyes, following line with finger when reading, unwillingness to engage in reading tasks, tendency to move near or away from light, difficulty reading from the chalkboard, screwing up face or frown when trying to see, moving the head when reading instead of the eyes, complaining of blurred or double vision and complaining of eye strain or headache when reading.

This study established that a good number of children in public primary schools in Kiambu, Murang'a and Kirinyaga exhibited unidentified visual problems. The prevalence of these visual problems from the highest to the lowest was; Unwillingness to engage in reading tasks (37%), following line with finger when reading (36%), difficulty reading from chalkboard (33%), holding book close when reading (30%), frequent blinking of eyes (26%), tendency to move near or away from light (25%), omission of letters and words when reading (24%), moving head instead of eyes when reading (23%),

screwing up face or frowning when trying to see (20%), eye strains or headaches (18%), blurred or double vision (16%) and stumbling on objects when walking (6%). The prevalence of the various vision problems in school children as revealed in this study may be a good argument for the schools to consider regular vision screening programs for early identification.

5.2.4 Extent of Visual Loss in Children

To achieve the objective of determining the visual loss in children, this study assessed the visual acuity of the respondents. In this study, a visual acuity of 6/12 or worse in either one or both eyes was considered to be significant visual loss and worthy of further assessments and interventions. From the study findings, children who had visual acuity of 6/12 or worse in one or both eyes accounted for (8.75%).

During the study, it was discovered that in all the public primary schools under study, none had performed visual screenings for the identification of visual losses in children. Another significant discovery was that 3 children had a visual acuity of 6/60 which indicated severe visual loss. Interestingly, one of the respondents had severe visual loss of 6/60 in the right eye, a discovery which was made for the first time.

The prevalence of mild to severe visual losses in children as revealed in this study may be a good argument for implementing regular vision screening in all public primary schools to help identification those affected. Additionally, special education in- service courses will be necessary if teachers will be effective in identifying children with visual problems.

5.2.5 How Teachers Supported Children with Visual Problems

This study investigated the kind of support the teachers offered to children with possible visual problems. The support teachers offered included advising them to seek medical help for their visual problems, washing eyes with salty water, avoiding dusty places, emphasizing general cleanliness and positioning children near chalkboard. These findings revealed that the respondents lacked awareness about appropriate supportive measures. This exposed the need for provision of appropriate special education support services for children with visual problems in public primary schools. It was interesting to note that two head teachers had solicited financial aid to support children who had severe vision loss in their schools. This kind of support was recommendable and ought to be emulated by teachers in other schools.

5.2.6 Teachers Constraints in Identifying and Supporting Children with Visual Problems

Item 7 and item 9 in the teacher's interview schedule sought to find out the constraints teachers encountered in identifying and supporting children with visual problems. One major constraint of identifying children with vision problems was lack of visual screening programs in the schools. The current study discovered that none of the participating schools had performed visual screening programs there before. Nonetheless, the teachers expressed appreciation of the visual screenings during the study and wished they were performed regularly so as to help identify children with vision problems for early interventions.

Another constraint that came out was lack of necessary knowledge and skills needed to effectively identify children with visual problems. This finding exposed the need for special education in- service courses for the teachers to heighten their awareness on visual problems. A different constraint of identifying children with visual problems in both rural and urban schools was lack of the skilled personnel and facilities to help perform visual checkups. This exposed the need for increasing the capacity of officers in the assessment centres to facilitate support for teachers in assessing children in need of special education services. Some teachers also said that some children never disclosed problems to them and hence, any possible vision problems remained

unidentified. This constraint exposed the need to enhance mutual relationships between teachers and the school children to help the latter feel free to open up, and possibly get assistance. Another challenge of identifying children with vision problems as highlighted by the respondents was having large classes of 40 children and above. This made it difficult for the teachers to keenly observe and notice individual children with any visual problems.

When the teachers were asked to point out the constraints they encountered in supporting children with visual problems, different views were expressed including: ignorance about the appropriate support services/ interventions needed by children with visual problems, parents' failure to report children's visual problems to teachers, some parents never heeded to the advice given which discouraged teachers and parent's lack of finances to seek specialized visual checkups for their children. Additional constraints mentioned by teachers in rural schools included religion barriers, illiteracy and ignorance of parents. In the urban schools, other constraints included working parents who had little time to observe their children to detect presence of visual problems and parents accusing teachers of labelling their children.

5.2.7 Teachers Views on Promotion of Early Identification of Children with Vision Problems

The last objective of this study sought to elicit suggestions of teachers regarding enhancing early identification of children with visual problems. Among the suggestions the teachers gave included frequent and regular school visual screening exercises to be performed by skilled personnel. This suggestion was important because as was discovered in this study, visual screening was not practiced in the public primary schools under study.

A number of teachers suggested that special education seminars and workshops for all in- service teachers would be of much help in as far as equipping them with relevant knowledge and skills on vision problems was concerned. Some teachers were of the opinion that fully equipping assessment centres with the relevant assessment facilities and qualified personnel would also go a long way in facilitating identification of children with vision problem early for interventions.

5.3 Conclusions

Based on the objectives and the analysis of the research findings, this study arrived at the following conclusions:

5.3.1 Teachers Demographic Characteristics

The findings on the demographic data of teachers showed that all the head teachers and class teachers had adequately interacted with the children long enough (for over one year). Hence, it was expected that they were in a position to describe any persistent vision problems the children exhibited. The study established that only one teacher had specialized in the area of visual impairments while majority had no special education qualifications. Interestingly, no head teacher had specialized in visual impairments. The study concluded that the teachers were in dire need of special education in-service courses to equip them with necessary knowledge and skills about visual impairments.

5.3.2 Teachers ability to identify Vision Problems in Children

Most of the teachers rated their ability to identify visual problems as moderately difficult. A number of teachers could easily identify some visual difficulties like tearing, red eyes and close reading. Visual conditions like painful eyes and blurred vision were not easily identified unless reported by the affected child. The study findings indicated that most of the teachers did

not take vision problems with much concern since they related them to allergies or minor ailments which would clear with time.

5.3.3 Vision Problems Exhibited by Children

All the vision problems that this study sought to investigate were common among the respondents as follows: holding book close when reading (30%), omission of letters and words when reading (24%), frequent blinking of eyes (26%), following line with finger when reading (36%), unwillingness to engage in reading tasks (37%), tendency to move near or away from light (25%), difficulty in reading from chalkboard (33%), screwing up face when trying to see (20%), moving head instead of eyes when reading (23%), complaining of blurred or double vision (16%), eye strains and headaches (18%) and stumbling on objects when walking (6%). Based on the findings of the study, it can be concluded that children with visual problems have not been adequately identified in public primary schools.

5.3.4 Extent of Visual Loss in Children

The research findings indicated that 8.75% of the participating children had mild to severe visual loss (visual acuity between 6/12- 6/60). Three participants (1.3%) had severe visual loss with a visual acuity of 6/60. One among them was discovered for the first time that he could not see using the right eye. Unfortunately, all the public primary schools under study had never

performed school vision screenings before. Therefore, this study revealed that there were children with unidentified visual loss. Hence, the necessity for regular visual screening programs and eye care services in schools to assist in identifying the visual losses amongst the children.

5.3.5 How Teachers Supported Children with Visual Problems

The kind of support teachers offered to children with visual problems was mainly based on general knowledge including washing eyes with salty water, avoiding dusty places, positioning child near the chalkboard and emphasizing general cleanliness. Another kind of support was offered by some head teachers who had organized financial support for children with severe visual loss in their schools.

5.3.6 Constraints in Identifying and Supporting Children with Visual Problems

This study established that teachers had constraints in identifying children with visual problems including lack of pertinent knowledge and skills about visual problems, lack of skilled personnel and facilities for visual problem identification purposes, children not disclosing their visual problems to the teachers and large classes which limited teachers' ability to have keen observation on individual children.

The key constraints that the teachers encountered in supporting children with visual problems embraced lack of know-how on the relevant services needed, parents failure to report their children's visual problems, lack of finances for visual checkups and the teachers not following advice given by teachers/ irresponsive parents.

5.3.7 Teachers' views on Promoting Early Identification of Visual Problems

The teacher's suggestions on the enhancement of identification children with vision problems embraced regular school visual screening programs on all children in public schools. Surprisingly, no visual screening programs had been performed in all the public primary school studied. Other suggestions included initiating workshops and seminars to equip teachers with necessary knowledge and skills to help them effectively identify and support children with visual problems. The teachers also suggested that Educational Assessment and Resource Centres be fully equipped with relevant assessment equipments and be manned by qualified personnel.

5.4 Recommendations

Based on the observations made during the course of this study and analysis of findings, the following recommendations were made aimed at enhancing early identification of children with vision problems geared to early interventions:

5.4.1 Learners

The current study recommended that every child should have a routine eye examination to test both near and distant vision. However, vision screening should not be a substitute for a complete eye and vision assessment by an eye doctor (ophthalmologists/ optometrists /eye care providers). Comprehensive eye and vision examinations should be made mandatory for all children first entering school and, regularly throughout their school years to ensure healthy eyes and adequate visual skills essential for successful academic achievement.

5.4.2 Parents

This study recommended the importance of continuing eye care to be discussed with parents and guardians. At the same time, parents and guardians ought to pay close attention to their children with regard to their visual conditions. In order for this to happen, it requires the coordinated efforts of the child's classroom teachers, special education teachers and parents. Parents should be educated about visual problems so they do not defer vision care for their children. The government through the Ministry of Education should provide resources for parents who cannot afford visual examinations for their children, as well as make it easier for them to make follow- ups.

5.4.3 Head Teachers and Teachers

The findings of this study have exposed some areas that the head teachers and teachers could improve to promote early identification of children with visual problems in public primary schools in Kenya. Based on the findings of the study, this study recommended the continuous training of new teachers and in-servicing of teachers in public primary schools. The head teachers should therefore endeavour to motivate their teachers by organizing fully facilitated special education in- service seminars and workshops for them. These will equip the teachers with up- to- date knowledge and skills on identification and support for children with special needs as well as motivate them become more vigilant to children's special needs. On the other hand, the teachers should enrol themselves for special education programmes and desist from wholly relying on free and sponsored government initiatives since many a times this may take long to come about.

The teachers ought to be keener in observing unusual characteristics in children which could be indicative of special needs. If and when these children are identified, the teachers should follow up to ensure that they get the necessary assessments and help from EARC or have specialized medical checkups. On the same note, teachers should organise a fund raiser for any child with special needs who may require specialized checkups or treatments.

At the same time, head teachers should make an effort to promote cooperation and openness between teachers, school children and their parents. This could be done through school meetings and individual child clinics when teachers, parents and the child meet to discuss all issues revolving around the child, including special needs. This way, teachers, parents and the children will be intertwined and will share information freely leaving no room for cover-up.

5.4.4 Educational Assessments and Resource Centres (EARCs)

This study recommends that the government through KIE should ensure that all EARCs have all the facilities and equipments needed for assessing all categories of special needs. Consequently, the Teachers Service Commission (TSC) should endeavour to post highly qualified teachers to be in charge of these centres. In addition, the assessment personnel should aggressively extend their services to individual rural and urban schools in their regions. This will go a long way in identifying children with visual problems or other special needs early enough for interventions.

5.4.5 Kenya Institute of Education (KIE)

According to the findings of this study, KIE needs to intensify curriculum for in- service teachers to include special education consider the curriculum for teacher training colleges to embrace and include the component of special needs. By doing this, the pre- service teachers will be equipped with the

necessary knowledge and skills to help them identify and support children with special needs effectively. Equally, KIE should take the inventiveness of developing coming up with a visual problem identification tool that can be used by the teachers to identify children with visual problems for early interventions.

5.4.6 Ministry of Education (MoE)

Due to the fact that visual problems in school children impact on academic performance, the study recommended that MoE introduce and implement school visual screening as a core program to be performed to all school children especially upon entry and at regular intervals thereafter. This will play a major role in identifying children with visual problems before they deteriorate.

Another recommendation was for the MoE to come up with programmes on special need sensitization for the teachers and school children which should be relayed through the various electronic media sources like radios and televisions. These programmes would clear the ignorance about special needs as well as enlighten them on the early signs and symptoms of different special needs. Such awareness may result in more children with visual problems being identified for early interventions.

5.5 Recommendations for further Research

In the process of carrying out this study, some areas were identified which would certainly attract some academic inquiry. In this regard, this study recommended further research in the following areas:

- Investigating teachers and family perceptions and attitudes towards children with vision problems.
- Exploring the effects of vision problems on academic achievement among school children in public schools
- Analysing educational and social implications of vision problems in rural and urban schools.

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APPENDIX 1

INTERVIEW SCHEDULE FOR THE HEAD TEACHERS

Name..... **School**.....

1. How long have you taught in this school? (Below1 yr) (1-2 yrs) (Over 2 yrs)
2. Have you done special Education? If YES, mention level (Certificate, Diploma or Degree) and area of specialization.
3. Have you come across children you suspect have vision problems in your school? [YES] [NO]
4. If YES (in 3 above), mention these vision related problems.
5. How can you rate the teachers' ability to identify children with vision problems? [Very Difficult] [Moderately Difficult] [Easy]
6. What are the reasons for your answer in (5) above?
7. In your own views, what are the constraints in identifying children with vision problems?
8. Do you offer any support to children you suspect to have vision problems? What kind of support do you give?
9. What kind of constraints do you encounter in providing support to children with vision problems?
10. Give your own suggestions on how early identification of children with vision problems could be enhanced.
11. Mention any other general observations, comments or suggestions regarding children with vision problems.

APPENDIX 2

INTERVIEW SCHEDULE FOR THE CLASS TEACHERS

Name..... **School** .....**Class**.....

1. How long have you taught this class? (Below1 yr), (1-2 yrs), (Over 2 yrs).
2. Have you done special Education? If YES, mention level (Certificate, Diploma or Degree) and area of specialization.
3. Have you come across children you suspect have vision problems in your class? [YES] [NO]
4. If YES (in 3 above), mention these vision related problems.
5. How can you rate your ability to identify children with vision problems? [Very Difficult] [Moderately Difficult] [Easy]
6. What are the reasons for your answer in (5) above?
7. In your own views, what are the constraints in identifying of children with vision problems?
8. Do you offer any support to children you suspect to have vision problems? What kind of support do you give?
9. What kind of constraints do you encounter in providing support to children with vision problems?
10. Give your own suggestions on how early identification of children with vision problems could be enhanced.
11. Mention any other general observations, comments or suggestions regarding children with vision problems.

APPENDIX 3

VISION PROBLEM IDENTIFICATION CHECKLIST

Name of Child.....**School**.....**Class**.....

DIRECTIONS:

- Please fill a form for each child
- Tick the most appropriate response (Never=0 Sometimes=1 Often=2).

Visual Problem symptoms	**Frequency of occurrence**		
	Never(0)	**Sometimes(1)**	**Often(2)**
Stumbling on objects when walking			
Holds book too close when reading/ close one eye when reading			
Omission of letters and words when reading			
Frequent blinking of eyes			
Follows line with finger when reading			
Unwillingness to engage in reading tasks			
Tendency to move near or away from light			
Difficulty reading from chalkboard			
Screwing up face or frown when trying to see			
Moving head when reading instead of the eyes			
Complaining of blurred vision or double vision when reading			
Complaining of eye strain or headaches when reading			

APPENDIX 4

VISUAL ACUITY CHECKER (SNELLEN CHART)

INSTRUCTIONS

- To be administered to each child
- Follow the laid down procedure and record visual acuity for each eye

Name of Child.....**School**.....**Class**.....

Procedure

- Measure 6m from the snellen chart to where the child is using a tape measure
- Let the child stand or sit at 6m(20 ft) from the snellen chart
- Determine on the dominant eye of the child so as to start testing the less dominant eye
- One eye is occluded
- Ask the child to read the letters loudly as directed upto where he/she is able to read (starting with the big letters)
- Visual acuity is noted and recorded
- Occluder is changed to the other eye and the process repeated

Record Visual Acuity

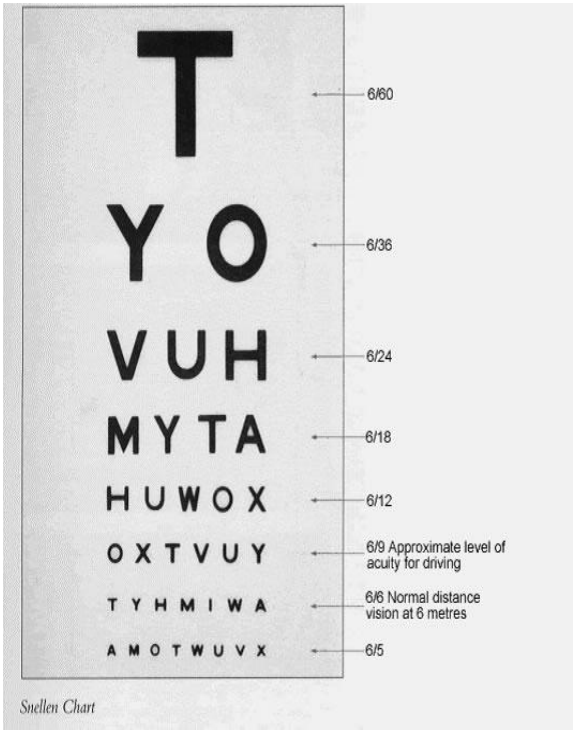
Visual Acuity (Right eye).....

Visual Acuity (Left eye).....

Any other visual problem noted.....

APPENDIX 5

SNELLEN CHART



<u>Determining dominant eye</u>

-Give the child a rolled paper and telling the child to observe an object in front of him/her at random through the rolled paper. The eye on which the child places the roller to look through is the dominant eye or the preferred eye or the better eye.

COVERING LETTER

To all Participating Head Teachers and Class Teachers

This is to request you to volunteer any information that could be of relevance to this study. Your views and opinions will be kept strictly confidential. The purpose of the interviews and the Vision Identification checklists is to help us identify children with vision problems. This will aid in enhancing early identification of children with vision problems for early interventions/ support.

You have been selected to participate in this research on the basis of being the head teacher/ class teacher and that you interact with the children more closely and regularly. Please note that this research has been organized by Kenyatta University and the Ministry of education, Science and Technology (MoEST).

Thank you for your cooperation,

Sarah Wanjiku Mwangi